This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

THE MONITOR AND THE NAVY UNDER STEAM

F. M. BENNETT

PROPERTY OF
University of Michigan Libraries
1817
ARTES SCIENTIA VERITAS

J. Ericsson

1865

THE MONITOR
AND
THE NAVY UNDER STEAM

BY

FRANK M. BENNETT
LIEUTENANT U. S. NAVY

With Illustrations

BOSTON AND NEW YORK
HOUGHTON, MIFFLIN AND COMPANY
The Riverside Press, Cambridge
1900

Transportation
VA
55
.B48

COPYRIGHT, 1900, BY FRANK M. BENNETT
AND HOUGHTON, MIFFLIN & CO.
ALL RIGHTS RESERVED

CONTENTS

CHAPTER I

ORIGIN AND PROGRESS OF STEAM NAVIGATION

The Nineteenth Century a Period of Remarkable Progress and Change. These Changes due to the Steam Engine. Complete Revolution in Naval Armaments and Methods. Important Period marked by Ericsson's Monitor. Evolution of the Ironclad. Beginning of Steam Navigation. Early Experimenters. Dr. Papin and the First Actual Steamboat, 1707. John Allen, 1729. Jonathan Hulls, 1736. Rumsey and Fitch in America. Miller and Symington, 1787–1789. Dundas and Symington, 1802. John Stevens, 1802. Screw Propeller patented before 1800. Robert Fulton and the Clermont, 1807. Steam first used in Navies. Influence of Fulton. The Demologos, the First War-Steamer ever built. Early American and English Steam Vessels of War. Disadvantages of Side Wheels. John Ericsson. Application of the Screw Propeller. Wider Field for Naval Operations made possible by Steam. Services of Steam Vessels in the War with Mexico. Influence of Steam and Machinery in the Expedition to Japan. The First Atlantic Cable laid by American and English War-Steamers. The Paraguay Expedition. Affair of the Pei-ho. Influence of Shell-Guns. The Question of Armor. The Stevens Circular Ironclad, 1812. The Timby Revolving Fort. The Stevens Battery. French Armored Batteries of 1854. Ironclads in Action at Kinburn, 1855. First French and English Armored Frigates. Armored Battery proposed by Ericsson in 1854 1

Transport
Davis
8 6 54
SS374

PREFACE

THIS book is written at the request of the publishers as a history of the origin, career, and influence of the United States ironclad steamer Monitor. The subject is a broad one, but is limited herein by the space proposed to only a cursory treatment. Many details have by necessity been left out, and only such material has been used as would serve best to indicate the important stages and events of the progressive story. It is the hope of the author that he has presented enough to impress his readers with the magnitude of the changes in all branches of human industry, and particularly in naval methods, that have been brought about by the steam engine during the course of the nineteenth century.

In the gradual transformation of ships of war from the wooden sailing-ship to the steel armored steam battleship, the Monitor occupies a midway station. More than half a century of steady progress in the application of steam power to the mechanic arts was necessary to make her possible, and her success in meeting the conditions for

which she was built served to fix a standard for future war-vessels, to sound the death-knell of the wooden ship of sails, and to herald to all navies the age of iron and steam. It is fitting, therefore, that the history of the Monitor should include accounts of the causes that produced her and the effects that followed after. Without these, the story would be but half told, though her brief war career was such as to make her one of the most famous ships the navy of the United States has ever contained, and might fittingly become the subject of a volume much larger than this. The Monitor has lain these many years at the bottom of the ocean, and the busy brain that created her has long since ceased its labors; but the features peculiar to her have been perpetuated and amplified in all navies, and the greatest battleships of the world are impressive monuments in memory of the great inventor.

F. M. B.

WASHINGTON, D. C.

CONTENTS

CHAPTER I

ORIGIN AND PROGRESS OF STEAM NAVIGATION

The Nineteenth Century a Period of Remarkable Progress and Change. These Changes due to the Steam Engine. Complete Revolution in Naval Armaments and Methods. Important Period marked by Ericsson's Monitor. Evolution of the Ironclad. Beginning of Steam Navigation. Early Experimenters. Dr. Papin and the First Actual Steamboat, 1707. John Allen, 1729. Jonathan Hulls, 1736. Rumsey and Fitch in America. Miller and Symington, 1787–1789. Dundas and Symington, 1802. John Stevens, 1802. Screw Propeller patented before 1800. Robert Fulton and the Clermont, 1807. Steam first used in Navies. Influence of Fulton. The Demologos, the First War-Steamer ever built. Early American and English Steam Vessels of War. Disadvantages of Side Wheels. John Ericsson. Application of the Screw Propeller. Wider Field for Naval Operations made possible by Steam. Services of Steam Vessels in the War with Mexico. Influence of Steam and Machinery in the Expedition to Japan. The First Atlantic Cable laid by American and English War-Steamers. The Paraguay Expedition. Affair of the Pei-ho. Influence of Shell-Guns. The Question of Armor. The Stevens Circular Ironclad, 1812. The Timby Revolving Fort. The Stevens Battery. French Armored Batteries of 1854. Ironclads in Action at Kinburn, 1855. First French and English Armored Frigates. Armored Battery proposed by Ericsson in 1854 1

CONTENTS

CHAPTER I

ORIGIN AND PROGRESS OF STEAM NAVIGATION

The Nineteenth Century a Period of Remarkable Progress and Change. These Changes due to the Steam Engine. Complete Revolution in Naval Armaments and Methods. Important Period marked by Ericsson's Monitor. Evolution of the Ironclad. Beginning of Steam Navigation. Early Experimenters. Dr. Papin and the First Actual Steamboat, 1707. John Allen, 1729. Jonathan Hulls, 1736. Rumsey and Fitch in America. Miller and Symington, 1787–1789. Dundas and Symington, 1802. John Stevens, 1802. Screw Propeller patented before 1800. Robert Fulton and the Clermont, 1807. Steam first used in Navies. Influence of Fulton. The Demologos, the First War-Steamer ever built. Early American and English Steam Vessels of War. Disadvantages of Side Wheels. John Ericsson. Application of the Screw Propeller. Wider Field for Naval Operations made possible by Steam. Services of Steam Vessels in the War with Mexico. Influence of Steam and Machinery in the Expedition to Japan. The First Atlantic Cable laid by American and English War-Steamers. The Paraguay Expedition. Affair of the Pei-ho. Influence of Shell-Guns. The Question of Armor. The Stevens Circular Ironclad, 1812. The Timby Revolving Fort. The Stevens Battery. French Armored Batteries of 1854. Ironclads in Action at Kinburn, 1855. First French and English Armored Frigates. Armored Battery proposed by Ericsson in 1854 1

CHAPTER II

BUILDING AND BATTLE OF THE IRONCLADS

Beginning of Armored Shipbuilding in the United States. Opinions of Board of Naval Officers regarding Ironclads. Navy Department advertises for Armored Ships. Three Plans accepted. The Gunboat Galena. The New Ironsides. The Monitor. Origin of the Name. Energy of John Ericsson. Building of the Monitor. Failure on First Trial. Vessel in Commission. The Frigate Merrimac. Efforts to save her from the Confederates. Scuttled and Upper Works burned. Raised by the Confederates. Converted into an Armored Battery. Race to complete the Ironclads of North and South. Importance of the Issue. Finished at the Same Time. Merrimac attacks and destroys Congress and Cumberland. Minnesota and other Federal Ships participate in the Action. Completeness of the Victory of the Merrimac. Dismay in Washington. The Crew of the Monitor. Perils of Her Voyage from New York. Her Timely Arrival in Hampton Roads. Ordered to defend the Minnesota. Battle with the Merrimac. Captain Worden disabled. The Merrimac abandons the Fight. Injuries of the Two Ships. The Monitor Successful. Far-reaching Influences of the Battle. The Advent of the Iron Age of Naval Construction. Subsequent History and Destruction of the Merrimac. Loss of the Monitor 69

CHAPTER III

SOME NAVAL EVENTS OF THE CIVIL WAR

Sailing-Vessels used to only a Limited Extent in the Civil War. Many Steamers added to the Navy. Importance of Naval Operations in the Mississippi River. Battle of the Forts below New Orleans. Loss of the Varuna. Farragut passes the Batteries at Vicksburg. Disaster to the Mound City. Encounter with the Ram Arkansas. Naval Battle at Port Hudson. Destruction of the Mississippi. Assem-

bling of Monitors off Charleston. Unsuccessful Attack on the Charleston Batteries. Lack of Confidence in Monitors. Defeat and Capture of the Atlanta by the Weehawken. Loss of the Weehawken. Injury to Commerce of the United States by Confederate Privateers and Cruisers. Career of the Alabama. Sinking of the Hatteras. Duel between the Kearsarge and the Alabama. Admiral Farragut's Great Battle in Mobile Bay. The Tecumseh destroyed by a Torpedo. Capture of the Tennessee. Results of the Battle 146

CHAPTER IV

EVOLUTION OF THE BATTLESHIP

Changes in War-ship Construction hastened by the Example of the Monitor. Revival of the Ram. Turret System of mounting Guns the Chief Legacy of the Monitor. Many Monitors built for the United States Navy. The Passaic Class. The Dictator and the Puritan. The Miantonomoh Class. The Dunderberg. Influence of the Monitor in Europe. Captain Cowper Coles and his Cupola Ship. The Rolf Krake and other Coles Monitors. The Huascar. First Turret Ships for the British Navy. The Royal Sovereign and the Prince Albert. The Monarch. The Captain. The Devastation and the Thunderer. The Inflexible. Smaller English Monitors. Broadside and Box-Battery Ships *versus* Turrets. Later English Battleships. The Turret Ship in France. The Italian Duilio. Ericsson's Invention adopted by the Nations of Northern Europe. Russian Monitors. Circular Ironclads. Decadence of the United States Navy after the Civil War. Miantonomoh Class rebuilt. The New Puritan. The Texas and the Maine. The Monterey. The First American Battleships. The Oregon and her Class. American and English Battleships compared. Remarkable Record of the Oregon. The Iowa. Latest American Battleships. The Arkansas Class of Monitors. The Modern Battleship the Offspring of the Monitor and Typical of the Iron Worker's Progress during the Nineteenth Century 212

CHAPTER V

PRINCIPAL ACTS OF THE NAVY IN THE WAR WITH SPAIN

Different Character of Naval Operations in the Far East and in the West Indies. Provocation for the War. The Maine sent to Havana. Her Destruction. Finding of the Naval Court of Inquiry. War Preparations. The American Asiatic Squadron. Battle in Manila Bay. Its Results. The North Atlantic Blockading Squadron. Rear Admiral Sampson. North Coast of Cuba blockaded. Affair at Matanzas. The Spanish Cape Verde Squadron. Naval Expedition to Puerto Rico. Battle at San Juan. First Casualties of the War. Spanish Squadron appears in the West Indies. Efforts to find it. Located at Santiago de Cuba. Blockade of Santiago established. Sinking of the Merrimac. Mine Defenses of Santiago Harbor. Bombardments. Landing of the American Army. Naval Battle of July Third. The Battle the Decisive Point of the War. Surrender of Santiago. The Victorious Fleet comes Home 269

LIST OF ILLUSTRATIONS

PAGE

JOHN ERICSSON. From his Contributions to the Centennial Exhibition . . . . . *Frontispiece*

TRIPLE HULL BOAT WITH PADDLE WHEELS, BY PATRICK MILLER, 1787. From Woodcroft's Origin and Progress of Steam Navigation 6

THE CLERMONT, 1807. From Woodcroft's Origin and Progress of Steam Navigation 10

UNITED STATES WAR STEAMER DEMOLOGOS, 1814. After original drawings by Fulton 12

GROWTH OF MARINE ENGINES AND ORDNANCE WITHIN FIFTY YEARS 20

FIRST FRENCH AND ENGLISH ARMOR-PLATED STEAM FRIGATES 64

French Frigate La Gloire, 1859. After design in Sir Thomas Brassey's The British Navy.

Arrangement of Armor on H. M. S. Black Prince. After design in Murray's Ship Building in Iron and Wood.

English Frigate Warrior, 1860. After design in Sir Thomas Brassey's The British Navy.

UNITED STATES IRONCLADS, 1862 76

Gunboat Galena. From volume viii. Official Records.

Frigate New Ironsides. After a sketch, 1863.

ERICSSON'S IRONCLAD CUPOLA VESSEL. Proposed to Emperor Napoleon II. in 1854. After design in "Contributions" 82

THE MONITOR, 1862. From "Contributions" 82

THE MERRIMAC 96

United States Steam Frigate, 1855. After a lithograph.

Confederate Armored Steam Ram, 1862. From volume vii. Official Records.

THE MONITOR AND MERRIMAC COMPARED 120

ACTION BETWEEN MONITOR AND MERRIMAC. From the painting by William F. Halsall, in the Capitol, Washington 130

U. S. S. HARTFORD. From a photograph 152

GROUP OF PORTRAITS 170
Andrew H. Foote, David D. Porter, David G. Farragut, Franklin Buchanan, John L. Worden. From photographs in the collection of the Massachusetts Commandery of the Military Order of the Loyal Legion of the United States.
ACTION BETWEEN THE KEARSARGE AND THE ALABAMA. From the painting by H. Durand Brager in the possession of the Union League Club, New York, N. Y. 196
U. S. S. DUNDERBERG. After design in Sir Thomas Brassey's The British Navy 220
EARLY FOREIGN TURRET SHIPS. After designs in Sir Thomas Brassey's The British Navy 232
Danish Ship Rolf Krake, Peruvian Ship Huascar, H. M. S. Royal Sovereign.
ENGLISH BATTLESHIPS, 1867–1871. After designs in Sir Thomas Brassey's The British Navy 240
Devastation, Captain, Monarch.
H. M. S. INFLEXIBLE, 1876. After design in the Naval Annual. Edited by T. A. Brassey 242
RUSSIAN CIRCULAR STEAM BATTERY NOVGOROD. After design in Sir Thomas Brassey's The British Navy . . 252
FRENCH TURRET RAM BOULEDOGUE. After design in Sir Thomas Brassey's The British Navy 252
UNITED STATES MONITOR PASSAIC, 1862. After design in Ericsson's "Contributions" 256
UNITED STATES MONITOR PURITAN, 1896. After Government drawings 256
UNITED STATES SECOND-CLASS BATTLESHIPS. After designs in the Naval Annual 258
Texas, Maine.
FIRST-CLASS BATTLESHIPS. After designs in the Naval Annual 262
U. S. S. Oregon, H. M. S. Centurion.
U. S. S. OREGON. From a photograph 264
U. S. PROTECTED CRUISER OLYMPIA. From a photograph 280
MANILA BAY. Adapted from Government Chart 286
ADMIRAL DEWEY. From a photograph 292
REAR ADMIRAL SAMPSON. From a photograph 292
U. S. ARMORED CRUISER NEW YORK. From a photograph 298
ENTRANCE OF SANTIAGO HARBOR. After Sketch in Proceedings U. S. Naval Institute, December, 1898 332

THE MONITOR AND THE NAVY UNDER STEAM

CHAPTER I

ORIGIN AND PROGRESS OF STEAM NAVIGATION

THE steam engine has made the nineteenth century a period of such marvelous advancement that it is not unusual to claim for it greater progress than was witnessed by the five or even ten centuries immediately preceding it. If we look back one hundred years and compare the surroundings of life with the conditions that we are familiar with to-day it is easy to realize that this is true. The eighteenth century ended with the world in practically the same condition as at its beginning, and the same may be said of the seventeenth century, and the sixteenth, and the others that went before. But in what a wonderful world of change we are living now! At the beginning of the present century no locomotive had ever turned a wheel upon a rail; there were no steamboats except here and there a rude affair that had not successfully emerged from the experimental stage;

the telegraph, the telephone, the dynamo, the electric motor and the electric light, and a multitude of other mechanical appliances, so familiar that they seem a natural and necessary part of our daily life, were absolutely unknown, and for the greater part not even thought of as within the bounds of human possibility.

In all this great transformation no change has been more complete and striking than that of naval armaments. At the beginning of the nineteenth century, and for many years afterward, the tall wooden sailing ship-of-the-line was regarded as the invincible sovereign of the seas and the embodiment of the best work that man was believed capable of. It had been developed by several centuries of slow growth, in which was much labor, experiment, experience, study, and patience; yet the grand result was swept away in a very small part of the time that had been necessary to produce it, and it was supplanted by a fabric a hundred fold more formidable, representing in infinitely greater variety the product of man's ingenuity, and so different in outward appearance and internal economy that it is difficult to imagine the one filling the sphere of the other.

It will be the purpose of this volume to describe this naval transformation, with special reference to its influence upon the history of our own country. Though young among the nations, we had the beginning of a navy and the beginning of

naval history before the advent of steam, and were thus in a position to accept and deal with it under the same considerations that appealed to older naval powers. The history of our navy under steam divides itself into two parts, rather sharply separated by a peculiar war-vessel forced into the field of action in advance of its natural time by the demands of a great war and destined suddenly to change by its example the naval armaments and methods of all nations. The first part deals with the early use of steam at sea; of its slow introduction for naval purposes; of the efforts to take advantage of its aid without giving up the outward appearance or established characteristics of the conventional ship of war, and of the extent to which it influenced and enlarged naval tactics and opportunity. Then came, abruptly and born of peculiar conditions, John Ericsson's Monitor, the central figure in a series of events that cast hopeless discredit upon the old-established type of warship, and was the beginning of the new naval history that has iron and steel and steam for its agencies.

The first attempts to make practical use of the power of steam and the earliest efforts to apply that power to boat propulsion were the beginnings of an evolution that ultimately produced the ironclad steamer and the greater battleship that sprang from it. A narrative of those early experiments belongs to the technical history of the

steam engine, and will not be undertaken here except to mention briefly the more important steps in the development, which is necessary that we may better understand the connection of events that follow.

Leaving out of consideration, then, the earliest attempts at steam navigation, it will answer for a beginning to say that the first authentic instance of a boat actually moved by steam power was in the year 1707, when Dr. Papin, the eminent French scientist, conducted a successful experiment at Marburg, in Upper Hesse, where he was a professor of mathematics. His efforts in the direction of science were so poorly appreciated that a mob of boatmen destroyed his boat and evinced such hostility to its inventor that he had to leave the country for personal safety.

In 1729 Dr. John Allen in England obtained a patent "For the application of certain powers to give motion to Engines whereby a Ship may be navigated in a calm, from whence innumerable advantages will accrue in Sayling, *and be a great preservation in Engagements at Sea.*" The specification of this invention describes the principle of jet propulsion, that is, moving a boat by the reaction of a stream of water forced out of the stern by pumps in the boat. The inventor proposed various engines for this duty and described one actuated by the explosion of gunpowder; he also suggested that steam might be used as the forcing power.

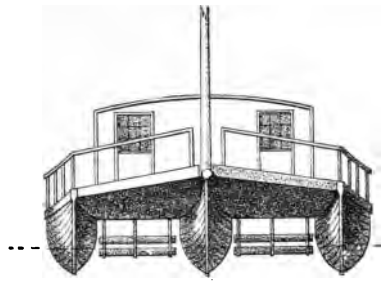
Jonathan Hulls, a clockmaker of Campden, in England, was granted a patent in 1736 for mechanism to drive a boat by steam power. There is no record that a trial was ever made with an actual boat, but the fact is of importance, as it is the first record of a patent of a steamboat.

In America James Rumsey and John Fitch were rival inventors and early experimenters with steamboats. Rumsey's boat, first tried in Virginia in 1784 and later in England, was constructed on the principle of jet propulsion. Fitch experimented with various propelling devices: an endless chain running over pulleys on the sides of the boat; paddle-wheels; long paddles operated in a manner similar to the motion of propelling a canoe, and a rude form of screw propeller. Some of his attempts were attended with a fair measure of success, but were not carried beyond the stage of experiment because of skepticism on the part of the public and lack of funds to make a commercial enterprise of steam navigation.

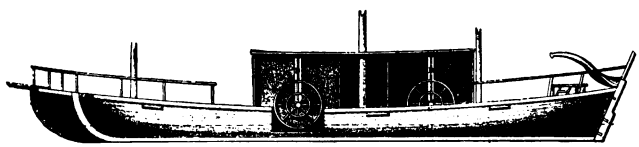
A very important stage in the development of the steamboat is marked by certain experiments under the direction of Patrick Miller in Scotland from 1787 to 1789. Miller was a gentleman of wealth, and first became interested in the subject by amusing himself with odd forms of boats on a lake on his estate. He built several small boats, or more correctly rafts, composed of two or three boats or hulls arranged parallel to each other and

propelled by paddle wheels placed in the spaces between them. Men were at first employed to turn these wheels, but it having been suggested that a steam engine might be used for the work, Miller engaged a Scotch engineer, William Symington by name, to make an engine and fit it in one of the boats. A small boat thus equipped was tried with such success in 1788 that a much larger craft and engine were built and experimented with the next year on the Forth and Clyde canal. A speed of seven miles an hour was realized, and the performance assured the future of steam afloat; but very strangely Mr. Miller, the patron of the enterprise, lost interest in it about that time and ordered the boat dismantled and laid up. His experimental zeal turned to the cultivation of exotic grasses, and the cause of steam received no more aid from him.

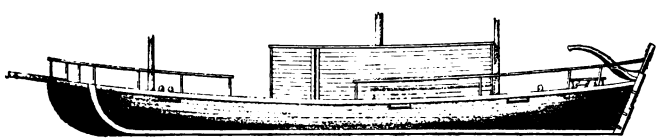
The benefit of these experiments was not lost, for in 1801 Lord Dundas employed the engineer, Symington, to apply the experience he had gained with Miller to the problem of substituting steam power for horses for towing purposes on the Forth and Clyde canal. In 1802 Symington completed a tow-boat named Charlotte Dundas that proved its fitness for the desired work by towing two barges, of seventy tons each, twenty miles in six hours against a strong head wind. This boat had one paddle wheel located in a well-hole near the stern, turned by a single-cylinder engine very



Bow View



Section



MILLER'S TRIPLE-HULL BOAT, 1787

Bernouilli for an essay on the manner of impelling boats without wind, in which he proposed the propeller. In 1785 Joseph Bramah had obtained a patent in England for a mode of propelling vessels by "a wheel with inclined Fans or Wings, similar to the fly of a Smoke-jack, or the vertical Sails of a Windmill," and patents for similar inventions were granted in England in 1784 to William Lyttleton and in 1800 to Edward Shorter. David Bushnell, an ingenious American, had actually made practical use of a screw propeller during the Revolutionary War by applying it, worked by hand power, to a submarine torpedo boat with which he designed to blow up a 50-gun British ship. These early instances of the screw propeller are particularly referred to because it will save many words when we come to a period much later when John Ericsson and several other engineers were claiming and disputing in the law courts the invention of that instrument.

The name of Robert Fulton stands foremost in the list of Americans who have been distinguished in the field of the mechanic arts during this century. He was a native of Pennsylvania, and in early life took up the profession of artist, in which while yet a youth he achieved reputation and pecuniary success by his skill in miniature portrait painting. In 1786, when twenty-one years of age, he went to Europe to study art with the distinguished American painter, Benjamin West, and

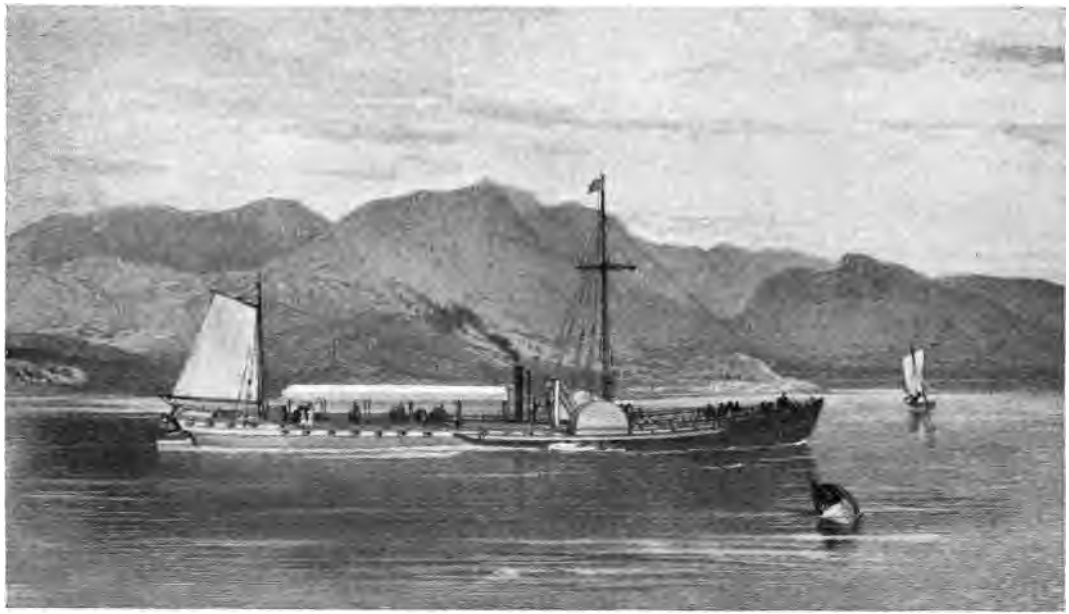
remained abroad twenty years before returning to his native country. During this period he devoted much time to mechanical investigation, and patented various machines for industrial purposes, gradually abandoning his art work and giving his whole time to engineering, which was his true field of labor. He became interested in the problem of steam navigation, and built one fairly successful steamer in France in 1803, which had to be given up for lack of means. He visited Symington in Scotland; and from seeing the Charlotte Dundas he became convinced that steam navigation was practicable, and resolved to devote himself to it until he had proved it successful.

The United States Ambassador to France at that time was Mr. Robert Livingston, who was interested in steamboats from having been associated with the experiments of John Stevens in America, and who decided, with Fulton's aid, to attempt to introduce steam navigation in his native country. As the agent of Livingston, Fulton went to England in 1804 and ordered from Boulton and Watt a large steam engine suitable for use in a boat. In 1806 he returned to the United States, and his engine soon followed him. It is worth mentioning that a special order from the king in council had to be obtained before this engine could be shipped from England, the exportation of machinery being then prohibited by law. A hull for the engine was built in New York and launched

early in 1807. This vessel, named Clermont after the home manor of Mr. Livingston on the Hudson River, was 133 feet long, 18 feet wide, and 9 feet depth of hold. In August the machinery was all fitted in place and the boat ready for trial.

While being built this steamer was ridiculed by the public as "Fulton's Folly;" about half a century later the public again made merry at the expense of an engineer, and enjoyed newspaper tirades against "Ericsson's Folly." On the 7th of August, 1807, the Clermont got up steam and got under way. A large crowd watched the proceeding with interest, and indulged in cat-calls and jeers whenever Mr. Fulton appeared in sight. Our modern public is more accustomed to great inventions, and possibly better bred, though we may easily imagine that a trial trip of a flying-machine, for instance, might now be attended with signs of skepticism, if not outspoken rudeness. Instead of furnishing amusement for the crowd, the Clermont swung into the stream and steamed up the river one hundred and ten miles without stopping, until she arrived at Clermont, the home of Livingston. Twenty hours later she continued to Albany, forty miles further up the river. The average speed for the whole time under way was about five miles an hour. The next day she left Albany and returned to New York in thirty hours by a continuous trip.

The success of this trip of the Clermont led to

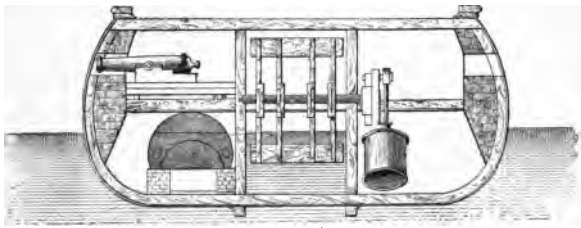


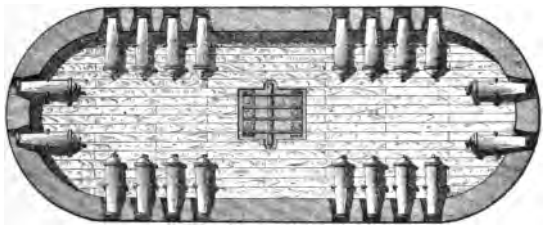
THE CLERMONT, 1807

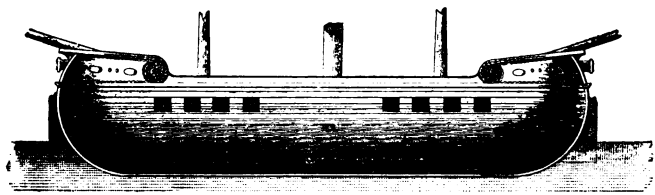
mont in 1807. The steamboat grew under many hands and many minds, and Fulton happened to be the first to put together the best work of his predecessors and make a combination that succeeded. That he had the judgment and mechanical talent to do this is sufficient to keep his name prominent for all time in the history of mechanical progress.

As Robert Fulton was the first successfully to apply steam to navigation for commercial purposes, so was he the first to apply it to purposes of naval warfare. In 1813 he submitted to President Madison plans for a steam battery to be used against the ships of England, then at war with the United States. His project was favored, and in March, 1814, Congress authorized the building of one or more such batteries for the defense of the coast. One vessel was built in about four months at Brown's shipyard on the East River, in New York city, and received its machinery at Fulton's engine works, on the North River. Mr. Fulton was the engineer in charge, or superintendent, of the whole construction. He named his battery Demologos, — "Voice of the People," — but it was afterward called Fulton in his honor. Because of the appearance of the same name in our list of ships at a later period this first war-steamer is known in naval records as Fulton the First.

The conventional form of a ship of war was discarded by Fulton, who proposed simply a huge floating battery that could be moved from place to







THE DEMOLOGOS, 1814

hour. This was more than Fulton had promised, as his offer to the government had specified a speed of 3 to 4 miles an hour only.

Very deplorably, Mr. Fulton did not live to know the success he had achieved. A sudden illness caused by exposure while traveling resulted fatally; his death, which occurred February 24, 1815, being mourned as a national calamity. The Coast and Harbor Defense Association, having direction of the building of war-vessels, referred as follows to this sad event when reporting the completion of the steamer: "Their exertions were further retarded by the premature and unexpected death of the engineer. The world was deprived of his invaluable labors before he had completed his favorite undertaking. They will not inquire, wherefore, in the dispensations of a Divine Providence, he was not permitted to realize his grand conception. His discoveries, however, survive for the benefit of mankind, *and will extend to unborn generations.*"

The war with Great Britain ceased a few months before the completion of the Fulton, and that novel craft therefore missed a conclusive trial of her worth by battle. But for this lack it is probable that her name would be famous in history as a victor, and as marking the date of an abrupt and complete change in naval armaments and sea tactics. In the design prepared by Fulton were all the elements that are essential for a battleship of

the present day, — positive motive power, heavy battery, and impregnable armor. The armor was of wood, it is true, but it was heavy enough to resist the fire of any ordnance then in use, and that is as much as can be hoped for now. At its thickest part this wooden armor was 5 feet through, diminishing below the water-line, as the drawings show. Beside the main battery of guns, Fulton proposed to have a submarine gun in each bow, to discharge a 100-pound shot at a depth of 10 feet below the surface. A furnace was supplied for heating shot, and there were pumps for throwing water on an enemy's deck to disable him by wetting his ordnance and powder, and dampening the ardor of his men.

The original plan contemplated a mastless steamer or movable battery only, but this was altered greatly in building. Captain David Porter, just home from his disastrous cruise with the Essex to the South Pacific, was assigned to the command of the steamer while she was being built. He was a sailor, and a good one, but his nautical mind could not grasp the idea of a ship without sails, and he accordingly caused a heavy mast, rigged to carry lateen-sails, to be stepped in each hull; bowsprits were also set in the ends of the hulls to carry jibs or head sails. To protect men required on the upper deck to handle these spars and sails it then became necessary to build up the sides, originally flush with the spar deck,

to form bullet-proof bulwarks, thus adding much to the weight of the structure. All this top hamper meant just so much more weight for the machinery to transport, and detracted from the efficiency and character of the battery without adding at all to its fighting qualities.

Thus, on the first possible occasion, did steam and sail power come into conflict, and steam had to take the inferior position. Had the war endured and given the Fulton an opportunity to attack the British ships blockading off the port of New York all subsequent naval history must have been different. Of the result of such an encounter there can be no doubt. Independent of wind and tide and able to take the sea when sailing-vessels could not move for lack of wind, the steam battery was free to select her opportunity, just as the Merrimac did years afterward, and her appearance in a squadron of sailing-ships would have caused more havoc with less risk than marked the raid of the later armor-clad battery. No stretch of the imagination is needed to picture the tranformation of navies that would have followed the destruction of a group of frigates by a single steamer. Spars and sails, despite sentiment, would have gone overboard in short order, and steam as a governing agent in naval warfare would have been hailed as a deliverer and given the recognition it has since won, by a struggle lasting through a long series of years. Such a change did follow

the performance of the Merrimac, but it was gradual rather than abrupt. By that time the rivalry between steam and sails was of long standing, had engendered much professional enmity, and had committed naval commanders to positive opinions, loudly expressed, that were difficult and bitter to retract. In the day of the Demologos naval prejudice against steam had not been cultivated and there were no obstacles to its adoption had it proved its value in battle.

As the first steam vessel of war ever built by any nation, the fate of the Demologos is worth recording. With the name Fulton she appeared in the navy list for a number of years as the receiving-ship at the Brooklyn navy-yard. On the 4th of June, 1829, her magazine blew up and completely wrecked the vessel, already falling into decay. Twenty-four people were killed outright, and nineteen wounded. The cause of the explosion has never been known, though there was a tale current at the time that it was the deliberate act of a gunner's mate who had been flogged the morning of the day the catastrophe occurred.

The first steam vessel in the British navy was the Comet, built in 1819. The name was derived from Bell's first commercial steamer on the Clyde, and it was from representations of Mr. Bell and the elder Brunel that the Admiralty became aware of the value of steamboats for towing men-of-war. The Comet was used for that purpose and, accord-

ing to Murray, was still in service in 1863. She was a side-wheel steamer, 115 feet long and 21 feet beam. A year later two similar steamers, slightly larger, named Lightning and Meteor, were built. In 1839 steam first appeared in battle, four small British paddle-wheel steamers taking part that year in the bombardment of St. Jean d'Acre. It was reported that they were able quickly to take the most advantageous positions and rendered great assistance. The first steam vessel of real importance in the British navy appeared in 1843 when the 46-gun frigate Penelope was cut in two, lengthened, and fitted with paddle-wheel engines. Several paddle-wheel ships were put under construction about the same time, of which the Valorous may answer for the type, as she survived so long as to be at the great Spithead review in 1889.

The long interval between the successful use of steam for commercial purposes afloat and its adoption on a large scale in the navy of Great Britain is accounted for by British naval writers. The head of the office charged with the design and building of war-ships in the early days of steam navigation was Captain (afterward Rear Admiral) Sir William Symonds, who had a great reputation for skill in handling ship's boats under sail. His sturdy opposition to the introduction of steam eventually put his country behind others in that development and led the Board of Admiralty to

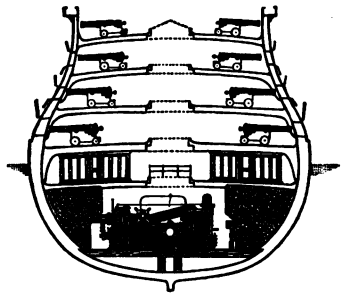
organize a committee of naval architects to design future ships for the navy. Sir William Symonds then resigned his office as surveyor, or director, of naval construction and was succeeded by Sir Baldwin Walker, — "a naval officer distinguished for his seamanship." His distinction in this direction was such that the progress of naval construction under his control is described as follows by a British historian: —

"The naval members of the Board of Admiralty were men who had long looked upon the noble line-of-battle-ships of the navy as not to be surpassed, and they could not apparently make up their minds to desecrate them, as they seemed to consider it, by the introduction of steam power. The result of this somewhat romantic feeling was, that early in Sir Baldwin Walker's administration a number of sailing three-deckers were laid down, in opposition to the expressed opinion of the leading civil professional officers attached to the Admiralty. Not one of these vessels, as had been predicted, was ever launched as a sailing vessel. They were converted into screw ships by being lengthened in midships, at the bows, and also at the sterns. The greater proportion of the other sailing three-deckers were also cut down and converted into two-decked screw ships, their sterns only being altered."

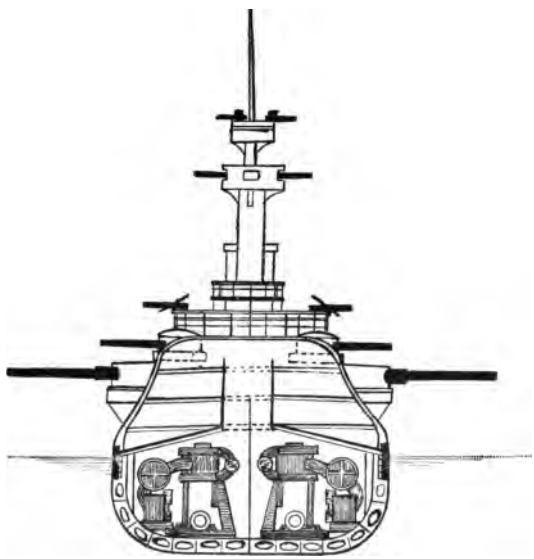
This reluctance to allow space for steam on board ship is well indicated by the accompanying

drawings showing sections of a ship-of-the-line about the year 1850 and a modern battleship. They show not only the development of the marine engine, but also put before the eye the growth of the gun during the same period.

In the navy of the United States, also, steam found no welcome in those early years, but its value was so shown by its general use in river and lake navigation that it was forced upon the attention of naval authorities more than was the case abroad. The performance of the Fulton in 1815 had caused Congress the next year to authorize the construction of another steam battery, but the law long remained a dead letter. Direction of naval affairs then was in the hands of a Board of Commissioners for the Navy, composed of three naval captains; a Board of Admiralty, in fact. This board, by the terms of the law creating it, was attached to the office of Secretary of the Navy, and under his superintendence exercised "all the ministerial duties of that office relative to the procurement of naval stores and materials, and the construction, armament, equipment, and employment of vessels of war, as well as other matters connected with the naval establishment of the United States." It was claimed that this law transferred to the commissioners the duties of the secretary prescribed by the organic law of 1798 creating the Navy Department, and, as interpreted by a prominent officer, "required superintendence



Section of Ship-of-the-Line, converted (1850) into Screw Steamer.



Section of Modern Battleship

was about 1200 tons. Side wheels, operated by engines on the upper deck, constituted the motive power. A speed of about twelve knots an hour was realized, and her first captain, Matthew C. Perry, of Mexican War and Japan Expedition fame later, reported: "For harbor and coast defense, the Fulton, with slight alterations, would be perfectly efficient, and more useful than any number of armed ships not propelled by steam."

Two years later, in 1839, work was begun on two much larger side-wheel steamers, completed in 1842, and named Missouri and Mississippi. They were 229 feet long, 40 feet beam, 19 feet draft, and of about 3200 tons displacement. The Missouri was burned in Gibraltar a year after her completion; the Mississippi, after a long and very eventful career, was destroyed in battle during the American Civil War in the river whose name she bore. Contemporary with these war-steamers was the smaller side-wheel steamer Michigan, the first iron vessel in the navy of the United States, and the first iron steamer afloat on the Great Lakes. This vessel was built in Pittsburgh, taken apart, and the pieces carried overland to Erie, where they were assembled and the ship was launched in 1843. The Michigan is still in active service, the only representative of our navy on the lakes, and has her original engines yet in use.

Iron had been used as a material for shipbuilding for a number of years, the first iron steamer

of which there is any record being the Caledonia, built at Dundee, in Scotland, in 1818. In 1836 a large establishment for building iron ships was opened at Millwall on the Thames, of which concern the eminent marine engineer, Mr. Fairbairn, was the head. It was early recognized that vessels with iron hulls had certain advantages over those of wood, but it was many years before the use of iron for shipbuilding became general. This was due chiefly to lack of knowledge and machinery for manufacturing and shaping iron of the large sizes and forms required, but with the demand for such forms came efforts to supply that demand. Thus was set in motion another of the various mechanical evolutions that contributed to make the Monitor and the battleship possible.

Many of the objections to the use of steam in navies were purely sentimental, built upon suspicion of innovation and the proverbial dogmatism of the professional seaman. One objection, however, had substantial foundation and was of sufficient gravity to make the building of steamers for war purposes a doubtful policy. This related to the mode of applying the engine power, which even to a landsman seemed very faulty. The large paddle wheels and important parts of the engines attached to them, including the main shafts, were high above water and thus exposed to damage by shot and shell. They occupied much space in the

central part of a vessel's broadsides, and in that way much reduced the battery and with it the fighting force of the ship. They also disturbed the accepted arrangement of masts and sails, and were a real obstacle to progress when steaming against a head wind. The more conservative of the old school of naval officers considered these objections fatal, and were glad to rest upon the assertion that steam was unsuited for naval purposes. Younger seamen, and all engineers, recognized the military advantages that steam power gave to ships of war, and applied themselves to the problem of finding a better way of exerting that power.

One of the earliest efforts in this direction in the navy of the United States was the plan of Lieutenant W. W. Hunter, who proposed to put the paddle-wheels wholly under water. To effect this, the wheels were placed horizontally in great cylindrical recesses in the hull of the ship, the paddles or "floats" only projecting outside the line of the ship as they revolved. Three steamers of considerable size — the Union, Water Witch, and Alleghany — were built and experimented with between 1842 and 1848, but were not successful. The recesses or drums in which the wheels revolved were made to fit the wheels as closely as possible, but were of course full of water always being swept around by the wheels, which absorbed much of the power of the engines.

In the ordinary arrangement of vertical wheels, the unemployed parts of the wheels are in the air, where resistance is slight. The Hunter system was condemned by a naval board in 1849, and his ships were altered for other methods of propulsion.

Meanwhile, engineers, foremost among whom was John Ericsson, were developing the system of screw propulsion, and had brought it into successful use in several countries before the experiments of Hunter had been given up. We have already seen that the screw propeller in more than one form had been patented before the beginning of the present century, and that Mr. Stevens had applied it to a small steamboat as early as 1802. An Austrian engineer named Ressel had applied it, in 1829, to a boat with a six horse-power engine, and made six miles an hour for a time. His countrymen gave him a bronze monument, and the credit of being the first to use the screw for boat propulsion. In both England and France are other monuments ascribing the same credit to natives of those countries. It is idle, therefore, to weave into this review any of the controversy that once raged so fiercely, and is not extinguished yet, as to whether or not Ericsson was the inventor of the screw propeller. He was the first to lift it above the experimental stage and put it to permanent practical use, just as Fulton had made the experimental steamboat of his time a practical

success. Equally with Fulton, and for very similar service, is Ericsson entitled to honor in the history of steam navigation.

Ericsson's success with screw-propelled boats occurred in England in 1837–38. Unable to gain recognition from the Admiralty, he, in 1839, removed to the United States, which country thereafter was his home. Under the patronage of Captain R. F. Stockton of the United States navy, one of the few officers who favored the use of steam in naval vessels, Ericsson in the years 1842 and 1843 superintended the building of a sloop-of-war named Princeton, fitted with his patented screw and with peculiar machinery of his design. The Princeton was of about 1000 tons displacement, and was the first screw steam vessel of war ever built in any country. She was also the first war-vessel in which all the machinery was below the water line, out of reach of shot, and the first to be supplied with fan blowers for forcing the furnace fires.

The Princeton is famous in American history because of a terrible tragedy that occurred on board. In February, 1844, she steamed from Washington for a pleasure trip down the Potomac River, having on board President Tyler and his Cabinet and other distinguished guests invited by Captain Stockton to witness the performance of the vessel and her machinery. One of the guns — an enormous cannon of 12-inches calibre, named Peacemaker, the largest piece of ordnance then afloat — exploded,

injuring many people, among them Stockton himself, and killing Abel P. Upshur, Secretary of State; Thomas W. Gilmer, Secretary of the Navy; Captain Beverly Kennon, of the navy; Virgil Maxey, of Maryland; Colonel David Gardiner; and a colored servant. Colonel Gardiner was a descendant of the "lords of the manor" of Gardiner's Island, and his tragic death led to an interesting romance. His body was taken to the White House, and in the ensuing distress and sympathy President Tyler became so interested in Gardiner's beautiful daughter, Julia, that he eventually married her.

Historically, however, the Princeton has a much greater claim to our interest because of the revolution in naval affairs that resulted from her example. Her success as a steamer was complete, and silenced the objections that up to that time had had enough of reason in them almost to exclude steam from navies. After the appearance of the Princeton with her submerged machinery and propeller the logical force of the protests against steam was destroyed, and the reconstruction of all navies of any importance became necessary. Besides settling the machinery dispute, Ericsson in this same ship introduced another factor that had much influence upon the after development of the ship of war. He had brought with him from England a huge wrought-iron gun of his own design, with which he experimented on iron targets and proved that four and

a half inches of armor could not stand against the gun. His gun was on the Princeton and was removed because the gun that burst was a poor imitation of it; but he had given naval men a new problem. They were required to find protection for ships against the fire of such powerful guns. The Ericsson gun and the target it perforated may still be seen in the small park near the commandant's office in the Brooklyn navy-yard.

The success of the Princeton caused a congressional committee, in 1846, to investigate the subject of the use of steam for naval purposes. The report of that committee dwelt upon the advantages of the submerged propeller and recommended that thirteen propeller steamers be built of iron immediately. It takes time to bring about radical changes, so when authority was voted the next year to build four war-steamers a board of prominent naval officers decided that three of the four should have side wheels. The most famous of these was the Powhatan. The one screw steamer was named San Jacinto, and later won a permanent place in naval and legal history by precipitating the affair of the Trent. It was not until 1854 that the work of rebuilding the American navy was seriously undertaken. In that year Congress ordered the building of "six first-class steam frigates to be provided with screw propellers." These ships were completed within two years, and were the superiors of any war-vessels then owned by any nation. The

Merrimac, built at Boston, is said to have been the most graceful of the class. They were full ship-rigged, with auxiliary steam power only, the machinery being ridiculously small for the size of the ship in comparison with present constructions. The late Rear Admiral Edward Simpson, in a magazine article published in 1886, gives the following explanation regarding the inadequate steam power of these ships.

"There were those at that time who, wise beyond their generation, recognized the full meaning of the advent of steam, and saw that it must supplant sails altogether as a motive power for ships. These advocated that new constructions should be provided with full steam power, with sails as an auxiliary; but the old pride in the sailing-ship, with her taut and graceful spars, could not be made to yield at once to the innovation; old traditions pointing to the necessity of full sail power could not be dispelled; it was considered a sufficient concession to admit steam on any terms, and thus the conservative and temporizing course was adopted of retaining full sail power, and utilizing steam as an auxiliary."

In 1857 five large screw sloops were ordered to be built at once. The Hartford became the most famous of these, and is a good example of the class. The next year Congress ordered seven more screw sloops, somewhat smaller, of which group the Mohican and Narragansett were types.

One, the Pawnee, is worthy of mention as the first vessel with twin screws in our navy. Thus, by the time the Civil War came upon us, the navy was fairly large for the nation at that time, and the steam engine had become a recognized and indispensable, though not a wholly welcome, element in naval armaments. Its use, however, had already greatly enlarged the scope and possibilities of naval enterprise. With its aid the navigator could declare his independence of winds, currents, and tides, and his movements became invested with an element of certainty that had been entirely lacking when he was at the mercy of natural forces. A steamer could put to sea at the appointed time regardless of the direction of the wind, and proceed on its voyage with a fair certainty of reaching its destination within a given time; it could ascend swift and winding rivers; venture into regions beset with ice or treacherous with rocks; and, in general, was capable of many undertakings that were full of peril or wholly forbidden to the ship of sails. It is not the purpose of this volume, nor possible within its limits, to present a connected history of events with which the navy of the United States has been concerned since the employment of steam; but it is proper that a few of those events be briefly touched upon, as a means of showing how naval operations were gradually influenced by the new power and eventually came to be entirely controlled by it.

The war with Mexico was declared by Congress to be in existence in May, 1846, and was formally ended by the treaty of Guadalupe Hidalgo in February, 1848. Mexico had no national navy, and the war therefore furnished no opportunity for battles at sea. Nevertheless, our navy bore its full share in the conflict, blockading and bombarding along the enemy's coasts, and has credit for some of the most decisive and lasting acts of the war. Notable among these was the seizure of the Mexican province of California, embracing a considerable part of the present territory of the United States west of the Mississippi River, and exceeding in area the combined domains of Germany, France, and Spain. It is known that the English government was contemplating taking possession of California as a means of protecting the interests of British subjects who held a large part of the Mexican national debt; before the war with the United States was anticipated, propositions had been made to Mexico to permit the British to occupy California as a guarantee until the bonds were paid. This was not a remarkable proposition; in fact, in much more recent times we have witnessed forcible interference in the affairs of Egypt on the part of Great Britain to protect the pockets of Englishmen who had large investments in that country.

Mexico did not agree to the proposed British occupation of California, but the British kept a

longing watch upon that desirable territory. When relations between Mexico and the United States were strained by a dispute as to the boundary of Texas, and a war seemed probable, an English naval squadron was assembled at Mazatlan on the west coast of Mexico with the scarcely concealed design of taking possession of California in the event of the threatened war. A small American squadron was also present at the same port, and its commander, Commodore John D. Sloat, by accidental good fortune, learned of the beginning of hostilities along the Rio Grande before the news became public and reached the British admiral. Understanding the importance of the situation, and without instructions, — for naval commanders in those days were not controlled by the telegraph wire, — Commodore Sloat instantly dispatched two of his vessels, the Cyane and Levant, names that had before been historically associated, to the northward, and followed soon after in his flagship, the Savannah. A few days later the British admiral learned that war had begun, and he also departed for the coast of California; but he was too late. The American navy had already taken possession of Monterey, the chief town of Upper California, and of San Francisco Bay, the chief harbor, and that great region has ever since been a part of the American republic. Had it become British instead of American, the history of the United States must have developed

very differently, and quite beyond the reach of present speculation. It is, indeed, not impossible that there might be no United States of America now; or had the Union endured as a sovereign state, it might be only for a precarious existence in the presence of powerful neighbors, and divided against itself by an issue that has been settled in history as it worked itself out along the lines that were ordained.

The vessels of Commodore Sloat that thus won an empire for the United States were sailing-ships, and this is the last instance in our history of an event of great national importance being decided by vessels of that kind. No great battle and victory were incident to the enterprise, and for that reason it has never been given a prominent place in history, though as a decisive event it outranks many battles on land and sea that are so celebrated in history that every school-boy knows their details.

On the east, or Gulf, coast of Mexico, a large American squadron was stationed to prevent arms and war material being supplied the enemy by foreign vessels, and to harass the coast in all ways consistent with the rules of warfare. This squadron was composed at first mainly of sailing-ships, but included the Mississippi and Princeton, the only serviceable war-steamers of any size that the United States then possessed. Blockading under sail on a coast subject to sudden and violent storms was difficult, and the steamers, by being able to

maintain position regardless of weather, had no difficulty in proving their superiority for war service. On one occasion the Mississippi went to New Orleans to get intrenching tools and a battery of field guns for the army, and returned to her station just one week after having left it, which quick trip amazed the old seamen in the fleet, and almost persuaded them against their wishes that there were virtues in steam power.

Captain Matthew C. Perry has been referred to as the first commander of the steamer Fulton, and as one of the few naval captains of the old school who appreciated the advantages to be gained from steam power and approved of its admission into the navy. In August, 1846, a few months after the war began, he was sent to the Gulf of Mexico to command the Mississippi, taking with him two small steam gunboats that had been bought and hastily equipped in New York when it became known that steamers were more useful than sailing-ships for the work required on the Mexican coast. The gunboats were named Spitfire and Vixen. Thereafter the history of naval operations on the Gulf coast of Mexico is largely a history of Commodore Perry and the steamers of war, for it seems that the commander of the squadron, Commodore Conner, held faith in the sailing-ships and allowed Perry to control the steamers pretty much as he pleased. The steamers, the smaller ones particularly, were able to enter rivers

and shallow coast waters, and therefore had a much better opportunity for active service than the large sailing-ships that required sea room and deep water for their own safety.

A comment regarding the title of commodore before used to designate naval chieftains will not be out of place. It may be surprising to those familiar with the names of our naval heroes known in the school histories as commodores to be told that there never was any such rank in the navy of the United States prior to the year 1862. The highest commissioned rank was that of captain, corresponding in relative rank to colonel in the army, and a captain when in command of a squadron had the honorary *title*, not rank, of commodore, and by custom his flagship flew a broad pennant indicative of the rank of commodore. Officially, therefore, the grand naval figures of our early history were captains, and not commodores at all, though we are taught to know them as commodores, and as commodores they will popularly remain through all our history. In 1862 an act of Congress increasing the navy to meet war conditions created the actual rank and legal title of commodore, and we had that grade for more than a third of a century, being almost the only nation that did recognize it except as a courtesy title. In March, 1899, an act of Congress reorganized the personnel of the navy upon a basis of modern conditions, and this act abolished the rank of com-

modore, except for purposes of retirement, making rear admiral the rank and title next above captain, the same as in all the principal naval services.

In October, 1846, Perry entered the Tabasco River with the Mississippi and Vixen, having some gun schooners in tow, and captured the town of Tabasco after a sharp fight; having no force with which to hold the place, he had to abandon it, but he made useful additions to his steam flotilla by capturing two small river steamers named Champion and Petrita. Toward the end of the year he took the Mississippi home for some needed repairs, and while he was at the north his familiarity with steam vessels was utilized by his being put in charge of fitting out small vessels for service in Mexico. These were the steam gunboats Scorpion and Scourge, and some bomb-ketches or mortar-boats intended to be towed into action by the steamers. A steam revenue cutter, the Polk, was also transferred to the navy for war service about this time.

Perry returned with the Mississippi in March, 1847, and relieved Commodore Conner as commander of the American squadron. His first important act was the valuable assistance rendered the army of General Winfield Scott in capturing the city of Vera Cruz. The army had begun the siege of the place, but found itself without ordnance heavy enough to breach the walls of the city. The navy was appealed to for heavy ship's guns, which Perry gladly offered to supply, but on

condition that his officers and men should go with them and work them. Scott, equally jealous for his profession, at first refused this, but realizing that the success of his undertaking depended upon the use of heavier guns, he finally accepted the offer, and six large guns were landed and dragged through the sand to the place of use, from whence their fire breached the walls after only a few days' attack. Several officers and men of the navy were killed or wounded while operating this naval battery. The earthwork defenses for this battery were laid out by an engineer of General Scott's staff, Captain Robert E. Lee, and in the army before Vera Cruz at that time were a number of young officers gaining experience for a greater war in which the following named became distinguished: First Lieutenants James Longstreet, P. G. T. Beauregard, John Sedgwick, and Earl Van Dorn; and Second Lieutenants U. S. Grant, George B. McClellan, Fitz John Porter, W. S. Hancock, and Thomas J. (Stonewall) Jackson.

The grim tragedy of the bombardment of Vera Cruz was relieved by a touch of comedy supplied by Commander Josiah Tattnall and two small steamers of the fleet. The batteries on shore investing the city suffered considerable annoyance from the guns of the famous old stone castle of San Juan d'Ulloa, built in the harbor by the Spaniards at enormous cost in the sixteenth century, and which had been abandoned by them in

1825 as their last foothold in Mexico. To divert this fire, Perry ordered Tattnall to approach and open fire on the castle with the Spitfire and Vixen. Tattnall, perhaps thinking that it was not a simple undertaking, asked for specific orders as to what point he should attack, to which "Ursa Major," as Perry was called behind his back, replied not too gently, "Where you can do the most execution, sir!" With his temper disturbed by this observation, Tattnall took his two little steamers within a stone's throw of the castle and opened furiously against its massive walls. The close proximity probably saved the little vessels, for they were untouched, while a storm of cannon balls flew over them. The spectacle was exciting to the crews of the onlooking ships, and ludicrous because of its futility. Perry, both amused and provoked by the exhibition of temper on the part of his subordinate, made signal for the steamers to withdraw, but Tattnall failed to see the signal and kept his position until a boat was sent in, at great risk, to call him back.

One of the small steamers afforded a naval lieutenant an opportunity for peculiar distinction in an incident that attracted great attention at the time, but is now almost forgotten. After the fall of Vera Cruz, when Scott's army was being prepared for its famous march to the city of Mexico, it was decided suddenly to seize a territory south of Vera Cruz in order to supply the army with

animals for transportation, which were abundant in that region. Lieutenant Charles G. Hunter of the navy, commanding the steamer Scourge, was ordered to lie off the town of Alvarado, the seaport of the vicinity, to watch the movements of the enemy and report them to his superior officers. At the same time General Quitman with a considerable military expedition proceeded inland to surround the region. Observing that the enemy did not hold Alvarado in force, Lieutenant Hunter steamed the Scourge up to the town and took possession of it, to the great disapprobation of Commodore Perry. Hunter was tried by court martial for exceeding or disobeying his orders, and was sent home in disgrace.

The people of the United States seized upon him as a popular hero because he had captured an enemy's city with a mere handful of sailors, and as "Alvarado Hunter" he was famous for many a day. Conversely, Commodore Perry received a great amount of abuse from a class of newspapers that from a superficial knowledge of military affairs, or no knowledge at all, assumed the obligation of reprimanding army and navy leaders in those days, just as is done to-day with even less regard for the truth. The real fact in the Alvarado incident is that Hunter by exceeding his instructions defeated the object in view. His act gave the Mexicans warning that a descent upon their vicinity was to be made, and afforded them

time to escape with their horses and portable property before the army had hemmed them in.

In June, 1847, Perry, with several of his small steamers, after severe fighting recaptured and held the town of Tabasco up the river of the same name. This event is important in naval history as it is the first instance of a large force of sailors being regularly organized into a naval brigade for prolonged service ashore, which was done under the personal direction and command of Commodore Perry. This use of seamen was made necessary by the fact that the marines of the fleet had been collected into a regiment and sent with General Scott's army on the march to Mexico. The year before, sailors had been used to some extent for guard and garrison duty at the points seized on the coast of California, but credit for organizing the first real naval brigade is given to Perry by naval historians.

The war was practically ended by General Scott's entry into the city of Mexico in September, 1847, but the navy continued blockading the coast until the following February, when the treaty of peace was concluded. The principal lesson to the navy from this war was that steamers were greatly superior to sailing-ships for war purposes, and naval prejudice against the adoption of steam was to a considerable extent overcome. Before the war was ended the Susquehanna and other large war-steamers before referred to were put under con-

struction, and not many years later the Merrimac and Hartford classes of steam frigates and sloops followed. Thereafter no war-vessels equipped with sails only were projected for the navy of the United States.

From the Mexican war, Commodore Perry progressed to a victory of peace that has given his name a more prominent place in history than would have been assured by all his deeds of war. Japan, the most interesting, and as it has transpired the most progressive of the nations of the Far East, was at that time the most retired of those nations and maintained an attitude of exclusiveness that bordered upon hostility. The increase of commerce with China and the development of whale fisheries in Asiatic waters were making it more and more necessary that Japan should become friendly with the rest of the world and allow the use of her ports as harbors of refuge from storms, or as places where vessels far from home might obtain needed supplies, even if the Japanese were not willing to engage in general commerce. The cession of California to the United States, though an event apparently without bearing upon the destiny of Japan, was really of great importance in that regard. The discovery of gold in California, almost immediately after it became a territory of the United States, led to the rapid settlement of that coast and such a consequent increase in commerce on the Pacific Ocean that its

needs made themselves felt across the ocean and on the shores of China and Japan.

The only concession that Japan had made to the friendly overtures of Western nations was to allow the Dutch to maintain a trading-post on a little fan-shaped island at Nagasaki, the one trader being restricted to the island and allowed to receive but one ship a year, which brought him goods and the only news of the world that he had from one year to another. To this place American and European sailors, who might be wrecked on the Japanese coast, and they were many, were taken and held as close prisoners until they could be shipped away on the solitary Dutch merchantman. In 1849 Commander James Glynn, in the United States brig Preble, visited Nagasaki to obtain the release of some shipwrecked American seamen held in duress there, and succeeded in his mission, though not without much difficulty, as the Japanese were not disposed to have any dealings whatever with any "outside barbarian" but the lonely Dutch trader.

Returning to the United States in 1851, Glynn represented that the interests of commerce in the East were such that it was necessary either to force or to flatter Japan into the brotherhood of nations, and proposed that he be sent with an imposing naval force with that object in view. The project met with approval, but Glynn himself did not have sufficient rank to command a squadron

of the size necessary to give force and dignity to the expedition, and the command was eventually given to Commodore Perry. He selected his steam favorite, the Mississippi, as his flagship, and the steamers Alleghany and Princeton were at his request also assigned to the squadron, but they were not made ready in time. The Mississippi in the interval since the Mexican war had made a three years' cruise in the Mediterranean, and had added to her laurels by conveying the famous Hungarian exile, Kossuth, from Turkey to France, and by bringing a number of his fellow-exiles to the United States.

Perry sailed, or more properly *steamed*, in the Mississippi from Norfolk, in November, 1852, proceeding on his voyage by way of the Cape of Good Hope, for that was nearly twenty years before the Suez Canal was opened. He arrived at Shanghai the following May, and transferred his flag to the larger steamer Susquehanna that had gone out to the station more than a year before. The squadron now consisted of the Susquehanna and Mississippi, and the sailing ships of war, Plymouth and Saratoga. With these, Perry proceeded to Japan, and early in July came to anchor in Yeddo Bay. Foreign ships were no curiosities in those waters even then, notwithstanding the determination of the Japanese to keep them away. Merchantmen and whalers often came there seeking in vain to trade with the people, or driven in by stress of weather

to be refused a harbor of refuge. Men-of-war of various countries had been there before seeking to negotiate treaties, a notable American attempt having been that of Commodore Preble seven years before in the ship-of-the-line Columbus, which had met with a positive refusal. Sometimes foreign ships came to restore to their country Japanese castaways picked up adrift at sea in their junks, but even these errands of mercy failed to move the authorities from their determination to have absolutely nothing to do with the outlanders. The increase from year to year of foreign sails in the waters that surround Japan had been noted as a growing portent of coming evil, and in 1850 the matter had become so serious that grave reports were made to the great dignitaries of the empire stating that no less than eighty-six of the "black ships of the barbarians" had been seen within the space of a single year from the headlands of Matsumaé.

Foreign ships therefore were not unfamiliar objects to the Japanese, but steamships were a novelty, as Perry's two frigates are believed to have been the first of the kind to appear in Japanese waters. Their volumes of smoke and capability of motion without sails greatly amazed the superstitious peasants, some of whom settled the mystery satisfactorily by agreeing that the foreigners must have captured and enslaved some of the well-known volcano demons; other some, unwilling

to believe the evidence of their own senses, comforted each other with the happy assurance that the uncanny spectacle was only a mirage created by the breath of clams, and would soon pass away. The better class and more intelligent Japanese knew well enough that the strange power within the unusual ships must be a practical application of some force of which they were ignorant, and being of an investigating and mechanical turn of mind they realized that it would be to their advantage to learn what it was. This curiosity had an important part in eventually deciding the authorities to make friends with the intruders, which was exactly what Commodore Perry had expected when he insisted upon the use of steamers for his expedition.

After a number of preliminary forms to show the Japanese that the visitors had come with a serious purpose and could not be turned away by refusals and threats, a meeting was arranged to take place on shore between Perry and two native commissioners of high rank selected for that purpose. This affair was studiously arranged for theatrical effect to impress the natives with the grandeur of the strangers and the importance of the event. Many officers in full-dress uniform and about four hundred armed men were landed, and every ceremonial observed that would have an effect upon a people accustomed to an extravagant system of official etiquette. Knowing the uselessness

of haste in dealing with Asiatics, Perry did not engage in any discussion of the object of his visit, but merely delivered, with much show of pomp and solemnity, a letter from the President of the United States addressed to the Emperor of Japan, asking that friendly relations between the two countries be established and explaining the advantages of such relations to both parties. With a promise to return the following year after the matter had been amply considered, the Americans closed the interview and with their ships returned to the sea whence they came, to the great relief of the Japanese.

The steam frigate Powhatan joined the squadron at Hong Kong and soon afterward became the flagship. . Headquarters were established at Macao, a Portuguese settlement near Hong Kong, where offices were rented and facilities created for officers and specialists with the expedition to write reports of what they had observed and perfect their sketches and drawings. There were a number of civilians with the expedition, to give it the benefit of expert knowledge in arts and sciences not familiar to naval officers. Among these were Bayard Taylor, the "landscape painter in words," and Messrs. Heine and Brown, the water-color artists whose beautiful pictures embellish Commodore Perry's report. In order to avoid the friction that seems unavoidable when civilians are associated with a military organization, these gentlemen were

enlisted for the time being as acting master's mates and were thus made amenable to naval law and discipline.

In January, 1854, the squadron proceeded northward again. Besides the three steamers there were several sailing ships of war and store-ships carrying coal and provisions for the squadron and presents for the Japanese government. An anchorage was reached in Yeddo Bay February 13, and it was then learned that the Japanese, so far from having decided to make a treaty, were desirous only that the strangers should stay away and leave them in peace and in ignorance of the world's knowledge. While waiting for them to get ready to discuss the matter the Americans employed their time by sounding and surveying the waters and giving intelligible names to the prominent features of the region. One name, Mississippi Bay, thus bestowed by American naval officers and so well known to all visitors to Japan, will serve for all time to perpetuate in a far country the name of the historic old steamer whose keel was the first of foreign build to disturb its waters.

A peremptory demand to leave Japanese waters was met by Perry moving his ships six miles further up the bay to a place about where the cosmopolitan city of Yokohama now stands, but which was then marked only by a few fisher huts. This alarmed the authorities so thoroughly that word was sent from Yeddo forthwith to make some sort

of treaty with the Americans where they were and prevent what was called the "national disgrace" of having their ships appear in sight of Yeddo. March 8 was selected as the day for meeting on shore in a treaty-house or pavilion built specially for the purpose on the shore at Yokohama. A large force of officers and men under arms was landed and the same pomp and ceremony observed as at the meeting of the year before. After the first formalities had been properly attended to, a detailed discussion of the situation was taken up and carried on from day to day through the entire month of March.

While this was going on, the curiosity and natural mechanical instincts of the people were being appealed to by the exhibition of a great variety of machinery and appliances that Perry had collected and brought with him with this end in view, knowing that self-interest would win the Japanese to his purpose where force and bluster would fail. A circular railway track was laid down, upon which a small locomotive and cars were daily run, to the great wonder and interest of the natives; a telegraph line was set up and operated; daguerreotype artists delighted the women and children, and so impressed the men that photography has become one of the arts in which the Japanese have excelled for many years. Machine tools, wood-working machinery, steam engines, sewing-machines, printing-presses, reapers and mowers, clocks, stoves,

firearms; everything, in fact, that the broad field of the mechanic arts had produced was called into use, and proved convincing arguments to even the most conservative Japanese that they had more to gain and more to learn by intercourse with the outside world than the preservation of their national seclusion was worth. The factors that decided Perry's success were his steamships and the machinery he brought with him, without which he doubtless would have failed as others had failed before him.

A treaty was agreed to and finally signed the last day of the month, March 31, 1854. It conceded little to the Americans, but served as the thin entering end of the wedge for greater privileges to follow afterward. By its terms the Japanese agreed to treat shipwrecked mariners with kindness; to allow vessels in distress to buy fuel, water, and provisions, and named two ports in Japan where foreign ships might resort for repairs or shelter from storms. Trade, except in ship supplies that were actually needed, was forbidden, as was also permission to foreigners to reside in Japan. These and other privileges, and the opening to foreign trade of several treaty ports, followed in due time through the efforts of English and other diplomats. The United States through its navy introduced Japan to the enlightened nations of the earth and enabled her to become one of them within one one-hundredth part

of the time that it had taken them to arrive at their degree of civilization. The advancement of Japan within the past fifty years is the most wonderful story in all history.

Another victory of peace that the advent of steam power enabled the United States to share was the laying of the first Atlantic cable in 1858. This great undertaking having been decided upon by a company of American and English capitalists, the large steam frigate Niagara was ordered to England in the spring of 1857 to assist in the work. One half the cable (about 1250 miles) was stowed on board the Niagara and the other half on board the British steam war-ship Agamemnon. The two ships left Valencia, Ireland, in August, the Niagara paying out her cable as they proceeded, with the arrangement that the Agamemnon would lay the American portion. The U. S. S. Susquehanna accompanied the expedition as a convoy to render any assistance that might be needed. Only four days after leaving Ireland the cable broke because of delays in the paying-out machinery, and the enterprise was abandoned for that year, the Niagara returning to the United States.

The next year the Niagara returned to England, and with the Agamemnon steamed to the middle of the Atlantic Ocean, from whence each ship started homeward, each paying out cable as they proceeded and maintaining telegraphic communi-

cation with each other. A break in the Agamemnon's section occasioned a delay of about a month, but in August both ends were landed, the Agamemnon's at Valencia and that carried by the Niagara at Trinity Bay, Newfoundland. This cable was operated about two weeks and transmitted four hundred messages, when it ceased working, owing to defective insulation. Capitalists who had furnished funds for the undertaking now lost faith in it, and but for the energy and perseverance of the original projector, Mr. Cyrus W. Field of New York, it might have been permanently abandoned.

Before preparations for another attempt were completed the Civil War in the United States came, and that of course caused a suspension of the enterprise. Finally, in 1865, with a larger and better made cable the work was resumed, and met with failure and bitter disappointment by the breaking and loss of the cable after twelve hundred miles had been laid, proceeding westward from Ireland. The huge steamship Great Eastern was used in this attempt, and again the next year, when a cable was successfully laid and telegraphic communication that has never been broken established between Europe and America. The most remarkable thing in the whole story of the ocean telegraph is that after the Great Eastern had successfully laid the new cable in 1866 she went to the middle of the ocean, located by

accurate navigation the point where the cable of the year before had parted and sank, and after a month's work actually succeeded in grappling the lost end in two miles of water, hauled it on board, spliced it to another cable carried by the ship, steamed to the American coast, landed the end, and thus completed the second telegraphic line under the ocean.

The value of steam in naval operations was forcibly shown in the conduct of an expedition that an unfortunate collision compelled the United States to direct against a South American republic. In 1855 the United States naval steamer Water Witch, for some time peaceably engaged in exploring the river La Plata and its tributaries, was fired upon by a Paraguayan fort and prevented from continuing the work. A seaman on duty at the wheel was killed, for which outrage our government demanded redress in the form of an apology for the indignity offered the flag, and an indemnity for the benefit of the family of the man who had lost his life. Lopez, the autocratic president of Paraguay, steadily refused consideration of the matter until finally diplomatic endeavors were exhausted, and Congress in 1858 authorized the President to use force to obtain satisfaction from that government. A naval expedition large enough to ensure a successful issue was made ready, and toward the end of the year was assembled in the river near Montevideo. In

preparing this expedition it became necessary, in consequence of a deficiency in the navy of light-draft vessels and of the unfitness of sailing-vessels for river service, to charter a number of steamers to be armed and equipped as war-vessels. Seven such steamers were hired and subsequently purchased for retention in the navy, and all rendered important service in the Paraguay expedition and in the civil war that followed so soon after.

Besides the seven chartered steamers, the expedition included the steamers Fulton and Water Witch of the navy and the famous little steam revenue cutter Harriet Lane, or ten steamers in all. There were also some sailing-frigates and sloops of war and three brigs, making a total of nineteen vessels of all classes, carrying about two hundred guns and twenty-five hundred men. The steamers ascended the river about three hundred miles to a point above Rosario, towing with them the brigs, one sloop of war, and two store-ships, the aggregate force thus moved inland being 1740 men and 78 guns. The commander of the naval force, Flag Officer W. B. Shubrick, with a special commissioner representing the United States, then proceeded with the Fulton and Water Witch several hundred miles further up the river to Asuncion, the capital of Paraguay, where they arrived January 30, 1859. The presence of the large armed force down the river was known, and there was no delay in obtaining the respectful hearing

that had for so long been contemptuously refused. A satisfactory apology was made for firing on the flag of the United States; an indemnity was paid on the spot for killing the American seaman, and the special commissioner negotiated a new and advantageous commercial treaty with the Paraguayan government. Paraguay lies so far inland that without this flotilla of steamers to stem the current of the great river it is very doubtful if our efforts to punish a flagrant wrong could ever have been successful.

In June, 1859, a considerable number of British, French, and American war-vessels gathered at the mouth of the Pei-ho River in northern China, conveying ministers of their respective governments who were to proceed to Peking to exchange treaties that had been signed the year before. The attitude of the Chinese was hostile to the French and English because of a war of the previous year, and less so in degree only toward the Americans. The latter were represented by Flag Officer (Captain) Josiah Tattnall, whose flagship was the Powhatan. Honorable John E. Ward was the American minister. Because of the shoalness of the river, the foreigners were provided with a number of light-draft gunboats and dispatch-vessels to take the expedition forward after the heavy war-vessels would be compelled to anchor off the river entrance. The Americans, having no suitable small vessel of war, had chartered a small English steamer, the

Toey-wan, which was not armed, as it was intended only to take the American minister and his suite from the mouth of the Pei-ho to Peking.

The Chinese desired to delay or prevent altogether the exchange of the treaties, and it was found that they had rebuilt and armed the forts at the mouth of the river that the French and English had demolished the year before, and had also planted several barriers of stakes across the river. They refused to remove the barriers and gave notice to the English admiral that they would oppose with force any attempt to pass them and ascend the river. Tattnall in the Toey-wan, with Mr. Ward on board, steamed up to the barriers, hoping that the threat would not apply to Americans; but on sending an officer on shore with interpreters it was learned that no one would be allowed to pass without attack. The Toey-wan grounded while on this mission and was in great danger for a time, but floated at high water. Rear Admiral Hope, the British commander-in-chief, sent a gunboat to attempt to tow the Toey-wan off, and also offered Tattnall the use of another gunboat for himself and the minister, with the very unusual privilege of hoisting the American flag on it.

The next day, June 25, the gunboat flotilla, composed of one French and twelve English vessels, attempted to force the barriers, and at once became engaged in a desperate combat with seven forts at close range on both sides of the river. Several of

the frail improvised gunboats were soon sunk or disabled; their loss of men was frightful, and within fifteen minutes after the battle began it was evident, as Tattnall reported later, that they had no hope of success. Three vessels used as the British admiral's flagship were put out of action in succession, and he, after being seriously wounded, transferred his flag to a fourth before the day was done. The French commander-in-chief was also wounded. The Toey-wan remained for a time neutral, lying below the engagement, but Tattnall grew impatient of inaction, and finally with the laconic excuse that has ever since been famous, — "Blood is thicker than water," — he got under way and towed a number of barges containing a reserve of several hundred men up to the scene of action against a tide that they could not stem unaided. After nightfall these men and others landed and attempted to take the forts by assault, but were repulsed with heavy loss. The day's work cost about four hundred and fifty men killed and wounded, only twelve of whom were French.

After towing the English reserves into action, Tattnall with his flag lieutenant, Trenchard, went to the Cormorant, then hotly engaged and flying the admiral's flag, to pay a visit of sympathy to Admiral Hope, of whose injury he had just learned. When within a few feet of the Cormorant a round shot struck the American boat, killed the coxswain, wounded the flag lieutenant, and so injured the

boat that it barely gave its occupants time to board the Cormorant before it sank. While the officers were paying their respects to the wounded admiral, the American seamen of the boat's crew quietly edged forward and were soon busily fighting the British bow gun, the crew of which had become inadequate from casualties. Tattnall reproved the men for this conduct as a violation of neutrality, and the sailor-like answer, — "Beg pardon, sir, but seein' them so short-handed we just thought we 'd give them a lift for fellowship's sake," is quite as worthy of preservation as Tattnall's "Blood is thicker than water." Tattnall himself was subsequently assailed by anti-administration and anti-British newspapers at home for improperly departing from a position of strict neutrality; but the great mass of the American people upheld him, and he was thanked, through the State Department, by the British government. The history of our navy is none the worse for his act and his epigram.

During these years just reviewed, while steam was gaining its footing in all navies as well as in our own, the growth of the gun had forced the question of finding something better than wooden walls to resist its attack. This matter was not important in the great naval wars of the Napoleonic period, and the first advocates of iron armor for ships met with no encouragement. In those days the gun was a rude cast-iron affair, throwing at low velocity a solid shot not much larger, for most of

the guns in use, than a big apple. Except at close quarters, the tough and thick oaken sides of ships of war could stop these cannon balls, and even if one did penetrate, it was only a single missile that might or might not hit a man. Splinters from the passage of a shot through a wooden side were guarded against by nettings made for that special purpose of small tough ropes. The seaman of the period therefore had small need for better protection; indeed, it is probable that he would have thought it cowardly to put iron plates between himself and his enemy, for the age of the "wooden walls" was also the age of chivalry on the sea.

A great change came with the introduction, about the year 1825, of guns for firing explosive shells directly at an object instead of in an overhead curve from mortars. The gun for this purpose was the invention of Colonel Paixhans of the French army, who had been a soldier of Napoleon, and from him shell-guns were known for many years as Paixhans guns. The destructive effects of such shells bursting on the crowded decks of a wooden ship were obvious, but it was not until the beginning of the Crimean war that the full terror of the invention was shown by use. In November, 1853, at Sinope, a Russian squadron of six sailing-ships and three steamers assailed a Turkish squadron of nine sailing-ships and two steamers, lying at anchor and off their guard. The Russians had shell-guns and the Turks had not. It was a test

to destruction of shell against shot. Exploding shells set the Turkish ships on fire time after time, and in a very short engagement their fleet was practically destroyed. One steamer escaped, but all the other Turkish ships were captured or sunk, and their loss of life was frightful. The Russian loss was comparatively small. After the lesson of Sinope the nations of Europe began experimenting with iron-armored vessels, and the era of the ironclad may be considered as dating from that event.

Long before Sinope, however, many inventions and suggestions relative to armoring ships of war had been put forward, and in the United States there was one notable instance of an ironclad in actual course of construction. As early as 1812 Colonel John Stevens, whose experiments with steamboats have been described, had prepared plans for a peculiar armored ship of war. He proposed a circular vessel, heavily armed and armored, shaped something like a saucer, to be moored by a swivel in the channel to be defended, and fitted with submerged screw propellers so placed as to revolve the vessel rapidly about its mooring. The guns were to be fired as they came into line with the hostile object and reloaded before coming round again. No craft like this was ever built. In 1841, Mr. Theodore R. Timby, of New York, submitted to the War Department plans for a revolving iron battery, and in 1843 he filed a caveat in the United States Patent Office

for "a metallic revolving fort to be used on land or water, and to be revolved by propelling engines located within the same, and acting upon suitable machinery." In this patent specification, and in the project of Stevens, it is easy to see some foreshadowing of the Monitor. Circular ironclads not unlike Stevens's design have been built since for the navy of Russia.

In 1841 also, Colonel Paixhans advised the use of iron plates on the sides of ships as a protection against his shells, but the French government rejected his plans. The same year the sons of Colonel Stevens proposed to the Navy Department to build an ironclad vessel of high speed, with screw propellers and all machinery below the water line. This proposal was accepted, and an act of Congress, approved April 14, 1842, authorized the Secretary of the Navy to contract for "the construction of a war-steamer, shot and shell proof, to be built principally of iron, upon the plan of the said Stevens." The armor of this vessel was to be $4\frac{1}{2}$ inches thick, which was believed by the Stevens brothers, from experiments of their own, to be sufficient to resist the fire of any gun known. Rather curiously, work on this vessel was retarded by John Ericsson, whose experiments with his big wrought-iron gun proved that the armor of the Stevens battery was insufficient. Work on it languished until 1854, when the builders proceeded in earnest with a much

larger battery that was to be plated with $6\frac{3}{4}$ inches of iron; this in turn was never finished, for causes not necessary to describe in this short review.

These are a few only of many early attempts to deal with the armor question, but they are sufficient to indicate the causes that made the problem important and to outline the steps that led to the demand for armored ships of war. The victory of the shell at Sinope was so complete that armor for ships was thereafter a necessity admitted by all. The French took the lead, and in 1854 began building several armored floating batteries, which, though large, may hardly be called ships, but were rather mere barges for transporting small forts. They were 164 feet long, $42\frac{1}{2}$ feet beam, 8 feet draft, and 1400 tons displacement. Auxiliary steam power applied through the screw was provided. The hulls were of timber, with 4 inches of iron armor, and each carried 18 50-pounder smooth-bore guns. They were fitted with masts and sails, for a mastless steamer was then a monstrosity that seamen could not understand and would not tolerate. When it was found that the batteries could not sail, the masts were replaced with light poles that could be unshipped in action, thus retaining at least a semblance of what was regarded as "ship-shape."

As soon as completed, three of these batteries, named Dévastation, Tonnante, and Lave, were sent out to the East under convoy of real ships.

On October 17, 1855, they had their battle trial by engaging the Russian forts at Kinburn. The allied French and British fleet at this attack numbered eighty vessels of all classes from ships-of-the-line to mortar-boats. The three armored batteries were put in an inner line of attack only 800 yards from the works, and in the event proved to be the decisive factors of the battle, so employing the Russian fire that not a man was killed on any of the great wooden ships present. At such short range the projectiles from the iron batteries were very destructive to the Russian works, the commander of which surrendered after three hours' fighting, 29 of his 62 guns being then dismounted. The Dévastation was struck 75 times; the others about 60 times each. Their armor was not pierced, the results of the hits they sustained being dents only about $1\frac{1}{2}$ inches deep. They had 2 men killed and 25 wounded, these casualties being the results of shot and splinters coming in at the very large gun-ports. These, as said before, were the only losses in the allied fleet. The Russians lost 45 killed and 130 wounded.

While these batteries were building, the English had undertaken a number of similar ones from plans furnished them by the French. Eight were built, but they were not finished in time to take any part in the war. The British and French officers at Kinburn were astonished at the invulnerability of the ironclads, and the great importance

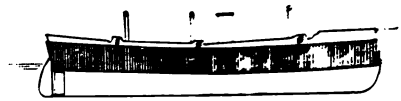
of armor for ships of war was finally admitted. The emperor of the French called to his aid a distinguished naval architect, M. Dupuy de Lôme, and immediately began a complete reconstruction of the French navy. They accepted the new aspect of naval affairs, and began the methodical creation of an ironclad navy, adhering as closely as changed conditions allowed to the various classes of ships that had been essential in the old navy of wood and canvas. The English, bound by stronger ties of sentiment to their tall frigates and ships-of-the-line, were loath to give them up, and did not follow the lead of the French until 1858, when the Admiralty reluctantly authorized the building of their first armored sea-going ship — the Warrior. Other armor-clads followed, but English conservatism had the result that for one short period, about the year 1861, their hereditary rival, France, actually outclassed them on the sea.

These early armored ships differed but slightly in appearance from the ships of former years, retaining as they did masts and spars for full ship rigs. The first French ship, La Gloire, was of wood, plated with iron from stem to stern, and was built on the model of an old screw ship-of-the-line, named Napoléon. The Warrior and the iron-cased frigates that followed her were built of iron with $4\frac{1}{2}$ inches of iron armor on a wood backing 18 inches thick. The example of France and

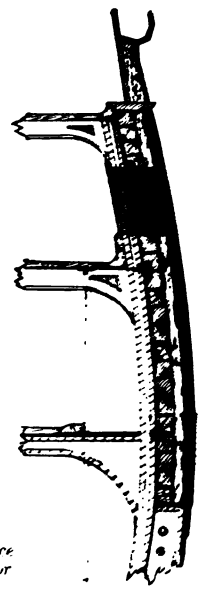
England was followed by other European nations, so that by 1861 Spain, Italy, Austria, and Denmark all had ironclads afloat or building.

The construction of these ships by rival nations, and the problem of piercing their armor that was naturally much discussed, resulted in the introduction of the rifled gun as yet another factor to assist in deciding the characteristics of the war-ship of the future. The rifle appeared first as a small shoulder-piece, or musket, used by infantry, from which it grew by degrees to the small field-gun and then to heavy cannon, fit for siege and naval uses. The first instance of its use on board ship is by the French in the Crimean war. It proved so much superior to smooth-bore guns, especially in trials against armor plates, that by the year 1859 France had adopted it as the standard for heavy artillery. Thus France contributed to naval and military science the first shell-guns, the first armored ship, and the first rifled cannon. We have already seen that but for official stubbornness or jealousy France might also have had the honor of giving the first practical steamboat to the world.

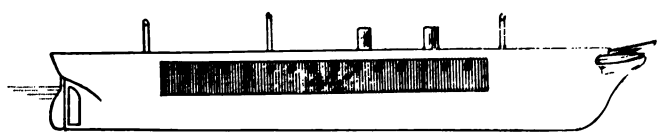
A few weeks after the French government had begun the iron-plated batteries that proved their worth at Kinburn, John Ericsson submitted to that government plans for an ironclad that in all essentials was the Monitor. The order directing the building of the batteries was dated September



La Gloire, 1859



Armor Section
H. M. S. Black Prince
(Sister Ship of Warrior



H. M. S. Warrior, 1860

FIRST FRENCH AND ENGLISH ARMORED FRIGATES

through numerous small holes in the turret. The products of combustion in the boilers and the impure air from the vessel are forced out through conductors leading to a cluster of small holes in the deck and turret. Surrounding objects are viewed through small perforations at appropriate places. Reflecting telescopes, capable of being protruded or withdrawn at pleasure, also afford a distinct view of surrounding objects. The rudderstock passes through a water-tight stuffing-box, so as to admit of the helm being worked within the vessel. Shot striking the deck are deflected, whilst shell exploding on it will prove harmless.

"Tube for projecting the shells to be made of cast iron or brass, 20 inches bore, 2 inches thick, and 10 feet long. It is open at one end, the other end being closed by a door moving on hinges provided with a cross-bar and set-screw, in order to be quickly opened and afterwards firmly secured. The shell is inserted through this door, and projected by the direct action of steam admitted from the boiler of the vessel through a large opening at the breech. The induction valve is made with a double face of large areas, and moved by mechanism of instantaneous action, susceptible of accurate regulation in regard to opening. One tube of the above description is placed on a level on the platform of the revolving turret."

The drawing, it will be noticed, shows an ordi-

nary cannon in the turret instead of the breech-loading steam gun described in the letter. Fortunately, perhaps, for the United States, the emperor of the French was not seriously impressed with this project, and it was permitted to remain on paper for several years. A note, written by a subordinate, was sent to Ericsson acknowledging the receipt of his plans, and there the matter dropped. The formal note began by saying, "The Emperor himself has examined with the greatest care the new system of naval attack that you have submitted to him," and this was all the reward Ericsson had for his trouble. His letter of explanation includes, in addition to what has been quoted, a description of two other steam guns, or tubes, to be placed low in the vessel for projecting shells (torpedoes) under water. The shell or torpedo is described as 16 inches in diameter and carried on the end of a cylinder of wood of the same diameter and 10 feet long. This "hydrostatic javelin," as Ericsson called it, was for the purpose of maintaining direction and flotation in the water.

We have now skimmed over briefly and imperfectly the history of many inventions relating to peace and war that combined to make the Monitor possible. It must not be supposed that any of these had yet reached perfection. The oldest of all — the steam engine — was still a crude machine compared with its present state, and its

right upon the sea was yet hotly disputed. In 1861 the greater part of the commerce of the world was carried in sailing-vessels, and in navies many distinguished officers wagged their heads wisely at the sight of steam ships of war and predicted that they could never withstand the shock and fire of battle. Others thought that the thin armor being applied to a few ships must certainly sink them in heavy weather, and, with few exceptions, all agreed that the inventor and engineer had brought evil days upon a formerly fair profession. A war would surely disprove the false claims of all these impudent innovations, and then the good old days might come again. The lesson of Hampton Roads was still in the future.

Great changes in all things were impending. Naval armaments were to be transformed so rapidly that they would be hardly recognizable, and in a much wider field all the conditions of life and the surroundings of society were to be upset and made more complicated, and at the same time easier for those capable of appreciating and using the arts placed within easy reach. The time had come when the mechanic could begin to harmonize the laws of the scientist and the dreams of the inventor, and out of the union to evolve the multitude of mechanisms that have given us an entirely new world, and so changed our environment and the conveniences of life that we wonder how our ancestors managed to exist at all.

CHAPTER II

BUILDING AND BATTLE OF THE IRONCLADS

We have now seen that by the year 1860 naval mechanisms and processes of manufacture had been so developed that ironclad steamships could be built. All that was lacking in the United States to prevent their building was a demand for such ships, and that demand was soon made by the outbreak of the Civil War. As at a later period, Congress had permitted but little advance in naval material, resting passive while foreign nations experimented with guns, armor, and machinery, and were slowly changing their ideas of war-ships. Our naval experts, however, were watching the results of foreign experiments, and stood ready to apply the knowledge so gained when the need came. It is unfortunate that our first use of armored ships should have been against ourselves, but in the march of national history it seems to have been necessary that such should be the case. Instead of the mechanical genius of the whole country being devoted to constructions in advance of the time for the discomfiture of a foreign foe, the inventive talents of two sections were arrayed in

hostile competition. The result was the creation of two types of armored steamers different from each other and from constructions abroad, but each possessing features that have been lasting and that have been repeated and improved in all subsequent naval shipbuilding.

Descriptions of the originals of these two types and a narrative of the causes and incidents joined in their building are essential to this history. In taking them up, the story of the inception and building of the ship of the North — the Monitor — will be told first, as it is logically joined to what was said in the latter part of the preceding chapter about plans for an armored ship sent by John Ericsson to the French emperor. It does not follow from this arrangement of subjects that the beginning of the Monitor was the incentive that caused the building of the ironclad of the South; on the contrary, it may appear as the two accounts are developed that the reverse was the case.

The first move toward providing the navy of the United States with an armored vessel for use in suppressing the rebellion was a joint resolution of Congress, approved June 24, 1861, directing the Secretary of the Navy to appoint a board of officers to examine the Stevens battery and report upon the expediency of completing it; the report was not made until near the end of that year, and advised against the completion of the vessel, which put an end to that project so far as the government

was concerned. Under date of July 4, 1861, Mr. Gideon Welles, Secretary of the Navy, reported to Congress the condition of the navy at that time when it was confronted with a great war; he referred to the progress abroad in armored ship-building, and asked that a board be authorized to investigate the subject and recommend some policy for the United States to assume toward it. The secretary did not commit himself in favor of iron-clads, but guardedly said that in case the report of the board should be favorable to them it must devolve upon Congress to decide whether or not the navy should be provided with them.

Congress authorized the appointment of the board asked for, by an act that was approved August 3, 1861, and the board made its report September 16, 1861. It referred briefly to the construction of ironclad war-steamers by foreign powers, and reviewed at some length the theories and opinions regarding armor held by naval and scientific experts. With this were many original opinions, though the report was prefaced with an explanation that the members of the board had no experience and but scanty knowledge of this branch of naval architecture. The members were three officers of the navy of high rank, — two captains and one commander, — all eminent in their calling and probably as well informed as any naval officers of that time. Their report is therefore of great interest, not only because of its importance

historically, but because of the insight it gives of the beliefs of progressive naval men of that day. So completely have many of these seemingly well-founded opinions been upset by experience within the short space of only a third of a century that the quotation of a few will be instructive; from them we may learn that in this era of growth and mechanical progress it is not safe to declare anything impossible.

"For coast and harbor defense they (ironclad ships) are, undoubtedly, formidable adjuncts to fortifications on land. As cruising vessels, however, we are skeptical as to their advantage and ultimate adoption."

"The enormous load of iron, as so much additional weight to the vessel; the great breadth of beam necessary to give her stability; the short supply of coal she will be able to stow in her bunkers; the greater power required to propel her; and the largely increased cost of construction, are objections to this class of vessels as cruisers, which we believe it is difficult to overcome."

"From what we know of the comparative advantages and disadvantages of ships constructed of wood over those of iron, we are clearly of opinion that no ironclad vessel of equal displacement can be made to obtain the same speed as one not thus encumbered, because her form would be better adapted to speed. Her form and dimensions, the unyielding nature of the shield, detract materially

in a heavy sea from the life, buoyancy, and spring which a ship built of wood possesses."

"Wooden ships may be said to be but coffins for their crews when brought in conflict with iron-clad vessels; but the speed of the former, we take for granted, being greater than that of the latter, they can readily choose their position and keep out of harm's way entirely."

"As yet we know of nothing superior to the large and heavy spherical shot in its destructive effects on vessels, whether plated or not."

"It is assumed that $4\frac{1}{2}$-inch plates are the heaviest armor a sea-going vessel can safely carry."

Besides investigating the armor question, this board was directed to examine and report upon plans for armored vessels that might be submitted to it, such plans having been advertised for by the Navy Department. This was a fine opportunity for inventors and patriots, genuine and otherwise, to rush to the aid of their country, and the chance was not neglected. Plans were offered for almost every imaginable form of war-vessel different from those then in use, and of every variety in size; some specified as much as 15,000 tons displacement, and one offered alleged formidable qualities on a displacement of only 90 tons; the estimates of cost were equally dispersed, ranging all the way from $32,000 to $1,500,000. Some were submitted by engineers and shipbuilders of ability and reputation, while others were the illusions of

impracticable speculators. The board in its report described seventeen of these projects and recommended that three be accepted.

The act of Congress that created the board also provided that, should its report be favorable, the Secretary of the Navy should cause one or more ironclad vessels to be constructed, a sum of $1,500,000 being appropriated for this use. Contracts were accordingly made immediately with the three successful competitors: these were Bushnell & Co., New Haven, Conn.; Merrick & Sons, Philadelphia, Pa.; and J. Ericsson, New York. The first-named firm undertook the construction of an armored gunboat that was named Galena, the designs for it having been prepared by Mr. S. H. Pook, afterward a constructor in the navy. The contract price was $235,250, and the vessel was built at Mystic Bridge, Conn. The Galena was not unlike an ordinary small war-steamer in appearance except that the upper part of her sides was rounded inward, or "tumbled home" as a sailor would say, at an angle of about forty-five degrees. She had one four-bladed screw propeller twelve feet in diameter, driven by engines of Ericsson's vibrating lever type, that will be more fully described further along; there were two horizontal tubular boilers with three furnaces in each, provided with blower engines for fan blast.

A battery of six large guns was mounted on a

gun-deck, protected by armor about four inches thick, on what was described as the "rail and plate principle," laid on over the wooden sides of the vessel. As soon as the Galena was completed she was sent to active service, and in her first engagement proved that her armor was insufficient. The morning of May 15, 1862, in company with the Monitor and some gunboats, she attacked a battery on Drewry's Bluff in the James River, about eight miles below Richmond, the battery being about two hundred feet above the water. The Galena, at anchor with her broadside sprung toward the battery, made a fine target for the plunging shot from the bluff, which struck her sloping side armor almost at right angles. The iron armor was penetrated thirteen times, several shots coming clear through and doing much damage, while others stuck in the wooden side after passing through the iron. The upper deck was badly torn and broken through in places; and all along the exposed side, planks, knees, beams, and bulkheads were splintered and started out of place. Thirteen men were killed and eleven wounded. In spite of this terrible ordeal, her commander, the gallant old John Rodgers, kept his ship in action for three hours and did not withdraw until his ammunition was almost spent. In his report of the battle he grimly remarked, "We demonstrated that she is not shot-proof."

Though not a success as an armor-clad, the

Galena was kept in active service as a gunboat throughout the war, and, lashed alongside the evil-starred Oneida, participated in Farragut's great victory in Mobile Bay. In the decade following the Civil War, economy was so rampant that Congress allowed the navy barely enough money to keep its old ships in repair and refused any shipbuilding efforts. To prevent the utter disappearance of our fleet, it was necessary to construe the word "repairs" in a somewhat elastic manner, and thus some new ships were built around old names. In this way the Galena was "repaired" about 1872 by the building of an entirely new wooden sloop-of-war of the same name, the old ship quietly disappearing as the new one grew.

The contract with Merrick & Sons of Philadelphia gave the navy the New Ironsides, the finest example of a battleship afloat at the time of her completion. Generally described, she was a large steam frigate of wood, with the main battery protected by an iron casement or citadel; this was of long and wide iron plates four inches thick, covering the sides of the ship for the length of the battery and crossing the gun-deck at each end, thus making a complete iron fort around the guns. The ship was 232 feet long, about 58 feet beam, and of 4120 tons displacement; the battery consisted of sixteen 11-inch Dahlgren guns, two 200-pounder Parrott rifles, and four 24-pounder howitzers. The contractors built the machinery

at their own works, but, not being shipbuilders, obtained the oak hull from the famous Cramp shipyard. Sails were still thought indispensable, and the New Ironsides was fully rigged as a bark when first fitted out, but when sent to war, the masts were taken out and replaced with light clothes-poles, giving her an appearance much like a modern fighting-ship.

The New Ironsides was completed late in 1862, and was sent at once to become the principal ship in the fleet of ironclads that for more than two years invested the city and harbor of Charleston, S. C. It is said that she was in action more days than any other vessel of our navy during the Civil War, and was struck by projectiles more than any ship that floated afterward in any war, but in all this she suffered very little damage. In one engagement with batteries on Sullivan's Island she was hit seventy times within three hours, and on another occasion was struck and somewhat injured by a torpedo. In one period of fifty-four days during the summer of 1863 she has a record of having fired *four thousand four hundred and thirty-nine* 11-inch projectiles. After the war, in December, 1866, she was destroyed by fire accidentally at the Philadelphia navy-yard.

After these brief but necessary accounts of the two vessels that were associated in their origin with the Monitor, we will proceed with the story of that epoch-making craft. It appears from the

records that Ericsson did not at first submit any plans of his vessel to the armor-board in Washington, his former dealings with the Navy Department not having been pleasant or encouraging. After Mr. Bushnell had been promised a contract to build the Galena, he went to New York to consult with Ericsson about the details of the work he was about to undertake; during the interview Ericsson exhibited a model showing the principles of the vessel he had proposed to the French seven years before. Mr. Bushnell was so impressed with the merits shown by the model that he insisted on bringing it to the attention of the armor board, which he was able to do through personal acquaintance with Secretary Welles, though the time allowed for the presentation of inventions had nearly elapsed. The project was rejected at first sight, but after a masterly description by Ericsson himself, induced to visit Washington for that purpose, and a belief in it expressed by Mr. Welles, the board gave its approval, and Ericsson was told to proceed at once with the construction; this he did with such energy that in the few days that elapsed before the formal contract was prepared he had material for his vessel going through the rolling-mill.

The contract, dated October 4, 1861, required Ericsson and his sureties to build an ironclad shot-proof steam battery, of iron and wood combined, of dimensions stated in general terms in

the document. A sea speed of eight knots per hour for twelve consecutive hours was specified. The contract price was $275,000, to be paid in five installments of $50,000 each and one of $25,000, payments to be made as often as the superintendent of construction should report that the progress of work warranted. A reservation of 25 per cent. was withheld from each payment, to be retained until after the satisfactory trial of the vessel, not less than ninety days after she should be ready for sea. The superintendent of construction on the part of the government was Chief Engineer Alban C. Stimers of the navy. The capitalists who became Ericsson's sureties and joined with him in making the contract were Messrs. C. S. Bushnell, John A. Griswold, and John F. Winslow.

One clause of the contract provided that if the vessel failed to make the specified speed, or should be wanting in other respects, the contractors should refund the full amount that had been paid them. This provision is probably the foundation of the widespread fiction that Ericsson and his sureties paid for the building of the Monitor out of their own pockets. Nothing is wider of the truth: every payment was made as the work progressed, according to contract, before the vessel left New York, and the twenty-five per cent. reservation was paid within a week after the famous fight in Hampton Roads. Another requirement

of the contract shows how reluctant the naval experts of that time were to admit steam on board war-ships except as an adjunct. It required the contractors to "furnish masts, spars, sails, and rigging of sufficient dimensions to drive the vessel at the rate of six knots per hour in a fair breeze of wind." Ericsson's ideas of stability as applied to light-draft vessels did not accord with this requirement, and he did not observe it; nor does it appear that any attempt was made to enforce it, for the Monitor was without mast, spar, or sail. Not many years later, the top hamper of masts and sails on a low-freeboard turret ship gave the British navy the tragedy of the Captain.

The name of the battery was given by Ericsson himself, as shown by the following letter written by him in January, 1862, to the Assistant Secretary of the Navy, Mr. Gustavus Vasa Fox: —

"SIR, — In accordance with your request, I now submit for your approbation a name for the floating battery at Greenpoint. The impregnable and aggressive character of this structure will admonish the leaders of the Southern Rebellion that the batteries on the banks of their rivers will no longer present barriers to the entrance of the Union forces. The ironclad intruder will thus prove a severe monitor to those leaders. But there are other leaders who will also be startled and admonished by the booming of the guns from

the impregnable iron turret. 'Downing Street' will hardly view with indifference this last 'Yankee notion,' this monitor. To the Lords of the Admiralty the new craft will be a monitor, suggesting doubts as to the propriety of completing those four steel-clad ships at three and a half millions apiece. On these and many similar grounds, I propose to name the new battery Monitor."

To hasten the work to the utmost, it was parceled out to many contractors. The hull (of iron) was built by Thomas F. Rowland at the Continental Iron Works, Greenpoint, N. Y., and the main engines and auxiliary machinery by Delamater & Co., of New York, while the turret came from the Novelty Iron Works, also of New York. The turret was built up of eight layers of one-inch iron plates bolted together. Many lesser establishments contributed to the great work by subcontracts for forgings, bolts, rivets, and other material. The amount of work done by Ericsson himself is almost incredible. He had practically nothing but his rude model to start with, and as there were no precedents for the vessel, nothing could be made until he supplied the plans. It all seems to have existed in his brain, needing only to be put upon paper to become intelligible to other people; and to his task he devoted himself with tireless energy. Hull, machinery, turret, gun-mounts, and details of all descriptions grew

from his designs, sketches of parts and pieces of machinery, as he wished them made, going from his drawing-table almost like sheets from a printing-press; these were usually rough pencil sketches that had to be perfected by his assistants, though in cases of great urgency his sketches had to go direct to the shops for the workmen to decipher as best they could.

Such speed was made with the work that the ship was launched January 30, 1862, with her main engines installed on board. This was one hundred and one working days from the date of the contract. The dimensions of the vessel as built followed closely the figures named in the contract. The extreme length was 172 feet; extreme beam, 41 feet 6 inches; depth of hold, 11 feet 4 inches; mean draft, 10 feet 6 inches; inside diameter of turret, 20 feet; height of turret, 9 feet; displacement, 987 tons. The iron hull was 124 feet long, 18 feet wide at the bottom, and 34 feet wide at the top where it joined to the armor raft or upper body; the latter was a sort of wooden raft on top of the iron hull. It is difficult to explain this arrangement, which was described by Ericsson as a fort on a raft, and bore no resemblance to any known form of seagoing ship. The drawings of the Monitor accompanying this chapter give good general impressions of the relative positions and dimensions of the under and upper bodies.

A provision of the great engineer's will required

that all his papers, drawings, journals, and records of every kind relating to his professional career, should be destroyed; this wish was carried out too well, and thus much of interest to history was lost. Some of the original drawings of the Monitor, though unfortunately a very incomplete set, were saved from the general destruction by Professor C. W. MacCord, of Stevens Institute, who had been chief draftsman in Ericsson's office at the time the vessel was built.

The top of the turret was made of bars of commercial railway iron, with two small openings left for escape hatches. The turret was large enough to permit of loading the guns at the muzzle when run inside, during which operation the gunports were screened by huge iron pendulums, swung
ss them. The pilot-house was built of heavy
billets almost a foot square, with the corners
tailed together like the timbers of a log cabin;
s located on deck, well forward, and was found
ttle to be in the way of firing the guns as well
t of communication with the turret, a speaking-
or voice-pipe for this purpose being found
iable in the noise and confusion of battle.
icsson's favorite form of steam engine was
described as the vibrating-lever type, by
h a rocking or oscillating motion was changed
tation by means of connecting rods. His first
ication of this was the rather remarkable half-
nder engine of the Princeton. The Monitor

had a double trunk engine with cylinder not different from ordinary engine practice, but with power transmitted by means of rocking arms as before. The cylinder, or cylinders, for there were really two though only one casting, were 36 inches in diameter and 27 inches stroke of piston. There were two return-tube "box" boilers, placed side by side forward of the engines, each containing two furnaces joined to the back combustion-chambers by large oval flues. The height of the boilers from water-bottoms to top of shell was 9 feet; from which it will be seen that they occupied almost all the vertical space between the bottom of the ship and the deck. Each boiler discharged its smoke through a short uptake to a grated hole in the deck, there being no smokepipes. The object in this was to keep the deck free from obstructions to firing the guns. The reason for the gratings was to keep missiles and débris from falling below. Sheet iron coamings, or trunks, about five feet high were provided to be bolted about these holes at sea to act as smokepipes and to keep water out, but they were to be unshipped and stowed away when the ship engaged in battle, leaving the deck clear except for the pilot-house. These movable trunks were unsatisfactory, and in all subsequent monitors smokepipes were provided.

There were no ventilators or deck-openings by which air could reach the furnaces, so a mild system of forced draft had to be resorted to. This

was supplied by two steam engines driving by belts two large fans that drew air from grated openings in the deck, similar to the smoke-holes and like them provided with the portable trunks, and discharged it into the engine-room and fire-room.

About three weeks after the launching, the Monitor had a trial trip that was such a dismal failure that she had to be towed home. Almost everything went wrong, though this is not to be wondered at when we remember how rapidly the structure had been put together, and that it was composed of many parts from different workshops without opportunity of trying them together while they were being finished. The main engines furnished inadequate power for driving the vessel, because the valves were set wrong. Both gun-carriages were disabled by firing the guns when the friction gear by which the recoil was to be taken up was not screwed up, and there were many minor defects discovered. The most serious fault was the inability of the steering-gear to control the vessel. The rudder, of the balanced type, was over-balanced; that is, the area forward of the axis was too great in proportion to that abaft it. The consequence was that when the rudder was put over either way, the over-large forward section offered so much resistance to being thrown back that the mechanical connection between the steering-wheel and the tiller was unequal to the

work. It was seriously proposed by the naval officials to put the ship in dock and fit her with a new rudder as a remedy for this defect, which would have required a month's time and, as events proved, have changed the history of the Monitor. Ericsson, probably angered by the knowledge that he had made a mistake in designing the rudder, is said to have been much enraged when this proposition was made known to him, and fiercely prohibited its being carried out. He said that he could remedy the defect in three days, and actually did so, though his method was only a makeshift. It consisted in interposing a pulley in each lead of the wire rope between the tiller and the drum of the steering-wheel, thus doubling the power of the wheel, though of course it had to be turned twice as much in order to obtain the same angle of helm.

These defects were remedied within two weeks, and on March 4th a final and successful trial trip was run, the guns were satisfactorily tried, and a favorable report was made by a board of naval officers. She had been under way once before this, after the first trial, to test the improvised steering arrangement, and had been regularly put in commission as a ship of the navy; this was done on February 25, Lieutenant John L. Worden being assigned to her command.

Having now brought the Monitor up to readiness for the field of action, we will undertake the

history of her famous antagonist, the Merrimac. In this case, there is lack of reliable material to work with, though much has been written on the subject. The original orders relating to her construction and the plans from which she was built are supposed to have been destroyed, together with much else of historical value, when the public offices in Richmond were burned shortly before the surrender of General Lee. Copies of some of the documents relating to her have been preserved by individuals, and, with recollections of persons concerned with her career, have appeared from time to time in historical works, in magazines, and in newspaper articles. From such sources of information, though admittedly not the best, as accurate an account of her creation will be prepared as the comparison of many conflicting statements will permit. This will follow in some detail, justified by the great influence exerted by the vessel upon naval construction and methods of warfare. Indeed, it may not be too much to assert that it was her example rather than that of the Monitor that drew the parting line between the old navies of wood and canvas and the new navies of steel and steam.

The Merrimac class of large sailing-frigates with auxiliary steam power has already been referred to. In the spring of 1861, when the long impending storm of civil war burst upon the nation, the Merrimac was lying at the navy-yard

in Norfolk, Virginia, within what was soon to become the enemy's country. She had made a cruise as flagship of the United States squadron in the Pacific, and, returning home in 1860, had been sent to a navy-yard for the customary overhauling after such service and for the remedying of certain inherent defects in her machinery. Several sailing ships of war were at the same navy-yard, the most interesting of these being the sloop-of-war Cumberland, in commission with a crew on board, and just returned from the usual winter cruise in the West Indies.

When it became evident that war between the North and South could not be prevented, the authorities in Washington made an effort to take the Merrimac away from Norfolk and thus prevent her from falling into the hands of those who would become enemies. To this end the commandant of the navy-yard was ordered to prepare the ship with all dispatch for removal to Philadelphia, the engineer-in-chief of the navy, Mr. Isherwood, being sent to Norfolk to expedite the work. He carried with him a peremptory order from the Secretary of the Navy to the commandant to render him every assistance and have his suggestions promptly carried into effect. It had been reported by officials of the navy-yard that it would require a month to put the machinery of the ship together and get it in working order. Nearly all the officers attached to the navy-yard

were Southerners and in sympathy with the brewing rebellion: so it is probable that this report was intended to deceive the commandant and discourage the project of removing the ship. Mr. Isherwood, with the assistance of the chief engineer of the station, who was a Northern man, succeeded in getting everything done and the vessel ready to move with her own steam within three days. This remarkable task was accomplished by employing a great number of mechanics and working them night and day, arranged in three watches or working gangs. It was a noteworthy example of how obstacles, seemingly unsurmountable, may be overcome by zeal and knowledge united for systematic exertion.

Steam was raised in the boilers and the engines were put in operation as the ship lay moored to the dock. It was then reported to the commandant that the ship was ready to proceed, but that officer hesitated about giving the order for her to go. He was old, and seemed unable to meet the responsibilities and perplexities that gathered so thickly about him, and it appears that he had been so completely deceived by his subordinates that he really did not understand the gravity of the situation. His personal courage and loyalty have never been questioned, though the results of his vacillation were far-reaching and disastrous. Beside the difficulties of the actual situation, he was hampered with orders from Washington not to do anything that

might appear hostile to the people of Virginia, a hope having been cherished until the last moment that Virginia, if not needlessly provoked, might remain in the Union that her soldiers and statesmen of other years had done so much to create. The removal of the Merrimac from Norfolk would have appeared a hostile act when the people were openly counting on her for their prospective navy; so in her regard the commandant had directly contradictory orders.

The Merrimac was ready for sea, with steam up, the 18th of April. The State Convention of Virginia had passed its Ordinance of Secession the day before, so there was no longer any reason for observing a pacific attitude for fear of provoking disloyal sentiments into open rebellion; the rebellion was already declared. Though urged during the day of the 18th to allow the departure of the frigate, the commandant persisted in withholding his permission, and toward evening gave the order to stop her engines and haul the fires, saying that he had decided to retain the vessel and defend the yard. This decision cost the United States the Merrimac immediately, and the far greater loss about a year later that resulted from her raid into Hampton Roads.

Following closely upon the events described, came an order to destroy public property and abandon the navy-yard. The steam sloop-of-war Pawnee with marines and soldiers on board was

sent to aid in the work of destruction, arriving at the yard the evening of April 20. Several vessels had already been scuttled and had sunk or were sinking. A petty officer and gang of men from the Cumberland opened the sea valves of the Merrimac and caused her to sink to the bottom, submerging the machinery but leaving the rigging and upper part of the hull out of water. Workshops, ship-houses, and ships were set on fire and ordnance material was damaged as much as the limited time and confusion permitted. Many fine uninjured cannon subsequently fell into the hands of the Confederates. Some hours after she sank, the upper works of the Merrimac caught fire from the burning ship-houses and burned down to the water's edge. Toward morning the Pawnee took the Cumberland in tow and departed, leaving the burning yard to the enemy, who at once took possession, put out many fires, saved the granite dry-dock from being blown up, and thus gained an important naval base.

The Merrimac and some other vessels were soon raised because they were obstructions to navigation, and not with the first intention of fitting them for active service. The sailing-ships Germantown and Plymouth had no machinery to be injured by submersion and could be made serviceable at no great cost; they were not made use of, however, probably because it was realized that the day of the sailing ship of war was over. The

appearance of the Merrimac when once more afloat, burnt down to the berth-deck and consequently lying low in the water, suggested at once the idea of converting her into a ram or floating battery; and several persons have left to their posterity traditions to the effect that they were the first to propose that adaptation.

Under date of May 8, 1861, the Confederate Secretary of the Navy, Mr. Mallory, wrote to the chairman of the Confederate naval committee, urging the construction of an ironclad, in these words: —

"I regard the possession of an iron-armored ship as a matter of the first necessity. Such a vessel at this time could traverse the entire coast of the United States, prevent all blockade, and encounter, with a fair prospect of success, their entire navy. If, to cope with them upon the sea, we follow their example, and build wooden ships, we shall have to construct several at one time, for one or two ships would fall an easy prey to their comparatively numerous frigates. But inequality of numbers may be compensated by invulnerability, and thus not only does economy, but naval success, dictate the wisdom and expediency of fighting with iron against wood without regard to first cost."

This was probably before the Merrimac had been raised and before any one had proposed converting her into an ironclad; at least this seems

so from the fact that Mr. Mallory did not refer to her, and in a later paragraph of his letter, not quoted, speaks of building an entirely new structure. It was also two months before Secretary Welles made his halting suggestion to the Congress of the United States on the same subject. Mr. Mallory was well informed in naval matters; he had been chairman of the committee on naval affairs in the United States Senate for several years, and had been distinguished for his interest in the navy and for his appreciation of the value of the changes that steam and mechanical agencies were forcing in naval methods. His initiative regarding armored ships was therefore based upon a better understanding of the importance of the question than was generally entertained at that time, and may fairly be taken as the first step in the train of events that compelled a revolution in war-ship design and changed the tactics of naval warfare. Those changes would have followed in due course of time from the beginnings that had been made in Europe, but the example and performance of the Monitor and Merrimac in America so hastened the development that it was abrupt instead of gradual.

In June Mr. Mallory appointed a board to decide upon a plan for converting the Merrimac into an ironclad battery. The board consisted of Lieutenant John M. Brooke, inventor of the Brooke rifled gun; Engineer-in-chief William P.

Williamson, and Chief Constructor John L. Porter, all of the Confederate navy, and all formerly officers of long service in the navy of the United States. Each has been given credit for the plan that was adopted, though there is no positive evidence that it was altogether original with any one of them. Brooke obtained a patent from the Confederate government for the "invention," and he was at first given the greater credit in newspaper report and public opinion; even Mr. Jefferson Davis, in "The Rise and Fall of the Confederacy," credited Mr. Brooke with being the projector of the Merrimac, but, being afterward convinced that he was mistaken, made a correction in a second book, — "A Short History of the Confederate States." Brooke himself in testifying before a Confederate congressional committee said that Mr. Williamson first proposed it, and he himself was opposed to it, but finally agreed to the report. The order directing the work to be undertaken does not refer to Brooke at all.

NAVY DEPARTMENT, RICHMOND, VA.

July 11, 1861.

FLAG OFFICER F. FORREST: You will proceed with all practicable dispatch to make the changes in the Merrimac, and to build, equip, and fit her in all respects, according to the designs and plans of the constructor and engineer, Messrs. Porter and Williamson. As time is of the utmost

importance in this matter, you will see that the work progresses without delay to completion.

S. R. MALLORY,
Secretary Confederate States Navy.

Descendants of Chief Engineer Williamson claim that he had made plans of an armored ship at least ten years before 1861 and that the Merrimac was almost a reproduction of those plans. Interest in the Stevens battery of course directed the minds of naval men to the possibilities of armor, and it is quite likely that every studious officer speculated with pencil and paper as to its application. The arrangement of armor on the Merrimac was so simple that it must have been thought of by many, just as a plan to sink another Merrimac in another war a generation later was claimed as original by several scores of persons. Constructor Porter's claim to the invention antedates Williamson's by several years. He had assisted Lieutenant Hunter in supervising the building of the Alleghany in Pittsburgh during the '40s, and had been concerned with that officer in devising a plan for a shield or protective deck for war-vessels. Porter was familiar with this plan, — had probably made the drawing, in fact, — and the burned-down condition of the Merrimac must have reminded him of it at once. He had a model of the Pittsburgh armor-clad that he took to the meeting of the Brooke board, though his idea

seems first to have been to propose an entirely new vessel from it. Difficulty in building machinery within the Confederacy suggested using that in the Merrimac, from which it was an easy step to think of using it where it was and adapting the shield to the hull of that vessel. Each member of the board undoubtedly exerted some influence upon the final form of the ship.

All the charred débris of the upper works was cut down and removed to the level of the berth-deck, which became the main deck of the structure and was intended to be at about the water line when the vessel should be armed and equipped for service. A large cast-iron spur or ram was secured to the bow about two feet below the water line and projecting eighteen inches beyond the cut-water. A citadel or casemate with rounded ends was erected on the main deck, occupying its full width and extending one hundred and seventy feet fore and aft. This was made of timbers sixteen inches square, sided close together and extending up at an angle of about thirty-two degrees; the lower ends of these timbers extended several feet below the waterways, but were at first armored on only about two feet of their extension. The vertical height of this citadel was seven feet, the upper ends of the timbers being joined to other timbers of the same dimensions that formed the rim of a large long hatch; this hatch was covered with gratings and thus served as an upper or promenade deck.

United States Frigate Merrimac. (*See page 59*)

Confederate Ram Merrimac, 1862

THE MERRIMAC

tunities for observation were therefore excellent and entitle his statements to all credit.

Accidental circumstances, as we have seen, and poverty in manufacturing resources decided the characteristics of the Merrimac. Her distinguishing features, however, were not novel, her type being practically that established by the floating batteries of the Crimean War, and not a new invention by any means. The ram with which she was fitted, though unusual at that time, was simply a revival of a former sea-weapon so old that it had figured prominently in the wars of Rome and Carthage before the Christian era. The same causes that determined the character of the Merrimac, the lack of iron manufactures particularly, operated to fix her type as that of all armored vessels built by the Confederate States within their own boundaries. Of these there were a number from first to last, some built entirely as new structures, like the famous Albemarle, and others improvised from vessels originally intended for other uses, as the Atlanta and Manassas.

Ironclads bearing a general resemblance to the Merrimac appeared under the United States flag also in the year 1861, but whether they were inspired by the French batteries of 1855 or were imitations of the Merrimac it is difficult to say. They were the property of the War Department and were built by the distinguished engineer James B. Eads for use in connection with army opera-

tions along the Mississippi River. Seven such steam batteries were built during the latter part of the year, and did much important service on the Mississippi and its tributaries. They were 175 feet long, 50 feet wide, and were propelled by a huge paddle-wheel placed near the stern. The casemate, like that of the Merrimac, was made of thick timbers with iron plating; this casemate enclosed the battery, the paddle wheel, and upper parts of engines and boilers. Besides these seven batteries, the War Department provided two others, much larger, by buying the river-steamers Essex and Benton and converting them on the plan of the other gunboats. All were transferred to the Navy Department in July, 1862.

The struggle between the armored ships of North and South began long before their actual meeting. The South, as has been described, took the lead in building sufficiently early to have gained control of the situation had mechanical possibilities been equal. As it was, the lateness of beginning at the North was exactly offset by better facilities for hastening the work when once undertaken, and the two ships were ready for battle at almost the same hour. The North did not lack establishments capable of producing all the varieties of iron material needed, and there was no lack of mechanics skilled in shaping and fitting that material for its manifold uses. At the South there was great dearth of manufacturing industries

and consequently few mechanics, the latter even being mostly importations from the North not in sympathy with the rebellion. The South had to learn by bitter experience what some nations already knew and others have learned since, — that the hammer of the artisan is a truer symbol of national power than the coronet of the patrician.

The advantage that an ironclad would give the Confederacy was not overstated by Secretary Mallory when he asked his Congress for authority to build one. It amounted in effect to the command of the sea, an advantage so great under the military situation then existing that it might have decided the success of the Southern cause. This was fully understood at the time both North and South, and was proved with fatal completeness on the day of battle, when the Merrimac met the best examples of the old navy and easily overcame them. The race to finish the ironclads was thus for high stakes, — the integrity of the American Union on one side hazarded against the life of a new and ambitious nation on the other.

Then, as now, the American demand for all the news, and the commercial rivalry of newspaper management to supply that demand, kept each side informed of the progress of the other. From letters written by Ericsson and to him while the Monitor was building it appears that there was great fear that the armored ship of the enemy would take the sea first, and there were many predictions

of disaster at the North when it was reported, about the end of January, that the Merrimac was ready. Her readiness was only to the extent that she had been floated out of dock and had yet to be equipped for sea, a condition that was matched by that of the Monitor, just launched and also undergoing equipment. Superior mechanical resources had already overcome the difference in time at the beginning of the race. At this period the people of the South had the greater confidence in the issue; though the North was eager to see the Monitor completed, it is a fact that the people pinned very little faith to that vessel. This is shown by a great amount of adverse newspaper criticism at the time, the complete novelty of Ericsson's vessel seeming to exclude it in public opinion from the field of action peculiar to ships of war. The Merrimac at least had the virtue of being built from a real ship that had made long voyages and still possessed many of the accepted features of a man-of-war.

The name of the Merrimac was changed to Virginia, but that name has seldom been used except by Southern writers. The alliterative union of the older name with that of the Monitor caught public fancy and fixed it in history to the exclusion of Virginia. The Monitor, as we have seen, was commissioned as a ship of war on the 25th of February, 1862. Though not a remarkable coincidence, it is nevertheless interesting that

orders to a Confederate officer to command the Merrimac were issued the day before, February 24. These orders, addressed to Flag Officer Franklin Buchanan and signed by Secretary Mallory, show so thoroughly the high hopes centred in the future of the Merrimac that they must be repeated as they were written: —

"You are hereby detached from the Office of 'Orders and Detail,' and will proceed to Norfolk and report to F. Officer Forrest for the command of the naval defenses of James River.

"You will hoist your flag on the Virginia, or any other vessel of your squadron, which will for the present embrace the Virginia, Patrick Henry, Jamestown, Teaser, Raleigh, and Beaufort.

"The Virginia is a novelty in naval construction, is untried, and her powers unknown, and the department will not give specific orders as to her attack upon the enemy. Her powers as a ram are regarded as very formidable, and it is hoped you may be able to test them.

"Like the bayonet charge of infantry, this mode of attack, while the most destructive, will commend itself to you in the present scarcity of ammunition. It is one also that may be rendered destructive at night against the enemy at anchor.

"Even without guns the ship would be formidable as a ram.

"Could you pass Old Point and make a dashing cruise on the Potomac as far as Washington, its

effect upon the public mind would be important to the cause.

"The condition of our country and the painful reverses we have just suffered demand our utmost exertions, and convinced as I am that the opportunity and the means for striking a decided blow for our navy are now for the first time presented, I congratulate you upon it and know that your judgment and gallantry will meet all just expectations.

"Action — prompt and successful action — now would be of serious importance to our cause."

On the 7th of March the following order, even more hopeful of the powers of the Merrimac, was sent to Captain Buchanan: —

"I submit for your consideration the attack of New York by the Virginia. Can the Virginia steam to New York and attack and burn the city? She can, I doubt not, pass Old Point safely, and in good weather and a smooth sea she could doubtless go to New York. Once in the bay she could shell and burn the city and the shipping. Such an event would eclipse all the glories of all the combats of the sea, would place every man in it preëminently high, and would strike a blow from which the enemy could never recover. Peace would inevitably follow. Bankers would withdraw their capital from the city, the Brooklyn navy-yard and its magazines and all the lower part of the city would be destroyed, and such an

event, by a single ship, would do more to achieve an immediate independence than would the results of many campaigns.

"Can the ship go there? Please give me your views."

The next day, March 8, the Merrimac got under way from the navy-yard and began the career that had been predicted for her. She was far from complete in many respects, but time was too valuable for the cause she represented to permit of more delay. Workmen were busy on board until the very moment of her departure. The guns had not been fired, the main engines were unreliable, and the steering-gear was insufficient. There had not been time to station and drill the crew, which was not composed of seamen, but was made up chiefly of volunteers from the army forces in the vicinity. The South was poor in sailors as well as in mechanics, but in the case of the Merrimac the lack of experienced seamen was not the source of weakness that it is usually represented to have been. An engine and boiler room personnel accustomed to ship conditions was of importance, but there was so little of the old-fashioned ship about the modified Merrimac that she furnished little in the peculiar line of work of the old-fashioned sailor. Soldiers, especially if they were artillerymen, were doubtless as good as sailors in the use and care of the battery and in keeping the living quarters clean, which was

about all that sailors could have found to do, and is the same work that soldiers do in garrison. Had the ship ever gone to sea, a number of sailors would of course have been essential for her management. Several officers and some of the men had seen service in the old navy, but the general character of the crew was as indicated. Under these conditions, the officers of experience on board could not share the popular enthusiasm as to the invincibility and probable achievements of the ship, and must have felt their mission more desperate than it looked to the admiring populace. It is even said that officers and men received communion before going out, but this, like many other picturesque tales of other great events, is probably a fiction based, maybe, upon the actions of a few.

With the Merrimac as she came out were two small improvised gunboats of one gun each, the Beaufort and the Raleigh. Lying some miles up the river above Newport News were three other gunboats of the James River squadron, the Patrick Henry, the Jamestown, and the Teaser. They immediately came down the river, passed the formidable Federal batteries at Newport News, and joined in the battle that ensued. The Patrick Henry is generally referred to as the Yorktown, having under that name been one of the finest and best-known steamers of the Old Dominion Company plying between New York and Vir-

ginian seaports; she was rated as of 1400 tons burden, and had been converted into a war-vessel of considerable force by the Confederates, who installed on her a battery of ten medium 32-pounder guns in broadside, one 10-inch shell-gun in pivot forward and one 8-inch pivot gun aft. It is a fact worth mentioning that this vessel was supplied with partial armor protection. One-inch iron plates, all the ship could bear, were put on abreast the boilers, extending a short distance below the water line and a few feet forward of and abaft the engine and boiler space. V-shaped shields of the same thickness were also put on the spar-deck forward of and abaft the engines as protections for the walking-beam and connections of the side-wheel machinery. The Jamestown was a sister ship of the Yorktown, taken from the same steamship company, but in the official records is reported as mounting only two guns. She was re-named Thomas Jefferson, but her better known merchant-ship name stuck to her. The Teaser was simply a river tugboat which carried but a single gun.

These steamers are mentioned particularly to dispel an idea, somewhat prevalent, that the battle of that day was wholly an issue to destruction between the old and the new, — wooden sailing-ships against an iron steamer. It was really a battle between squadrons, several Union vessels large and small having hastened to the aid of the

sailing-ships and influenced to a considerable extent the operations of the day. The small Confederate vessels had a part in the conflict of much more consequence than their character warranted: by moving about in dispersed positions they diverted attention to themselves, prevented a concentration of fire upon the Merrimac, and inflicted considerable damage upon their enemies with their few guns.

The Union force in and about Hampton Roads that day was large in ships and guns, if not in real effectiveness. Altogether there were present about twenty ships of war, so called, mounting nearly three hundred guns. Some were merely tugboats with one small gun; others were indifferent merchant-vessels, both sail and steam, with a few guns each, and one was the old frigate Brandywine, of fifty guns, dismantled and degraded to the status of a store-ship. The most formidable of the Union ships were the big screw frigates Roanoke and Minnesota of forty guns each, sister ships of the original Merrimac. The Roanoke was flagship and was also practically a sailing-ship, her main shaft having been broken several months before. The fact that this great ship was kept on active war service in that crippled condition is a perfect illustration of the belief of the time that sails were all-sufficient and steam of no consequence. A broken topsail yard would have sent the ship promptly to a navy-yard

for a new one. About five miles beyond Old Point, out toward Lynnhaven Bay, was the sailing-frigate St. Lawrence, 50 guns, at anchor, arrived only two days before from New York. Several miles inside Old Point, off the Federal batteries at Newport News, the sailing-frigate Congress of 50 guns, and the sloop-of-war Cumberland, 24 guns, had been lying for several months.

"Their ostensible duty," as remarked by Professor Soley in "The Blockade and the Cruisers," "was to blockade the James River; but it is not very clear how a sailing-vessel at anchor could be of any use for this purpose. Most of the old sailing-vessels of the navy had by this time been relegated to their proper place as school-ships, store-ships, and receiving-ships, or had been sent to foreign stations where their only duty was to display the flag. Nothing shows more clearly the persistence of old traditions than the presence of these helpless vessels in so dangerous a neighborhood. Although the ships themselves were of no value for modern warfare, their armament could ill be spared; and they carried between them over eight hundred officers and men, whose lives were exposed to fruitless sacrifice."

In addition to the forces afloat, each side had shore-batteries so located as to participate in the engagement and to some extent contribute to its features. The Union batteries at Newport News commanded the mouth of James River, and were

within close range of the Merrimac when she attacked the two sailing-ships. The Confederate batteries were at Sewell's Point, more remote from the place of hostilities, but were able to annoy the ships working up from Hampton Roads, firing upon each one in turn, and doing each one some injury.

From information exchanged between the lines by spies and enterprising newspapers it was known that a visit from the Merrimac was probable, but her actual appearance caught the two sailing-ships somewhat unexpectedly: their lower booms were rigged out with boats lying at them; wash-clothes were triced up in the rigging to dry, and each ship was without its captain. Commander Radford of the Cumberland was on board the Roanoke at Hampton Roads as a member of a court of inquiry, and Commander William Smith of the Congress had been officially detached the day before; he was still on board, however, and rendered service in the battle under the command of the executive officer, Lieutenant Joseph B. Smith. The latter was killed during the fight and the command devolved upon the next in rank, Lieutenant Pendergrast. The Cumberland was fought by her executive officer, Lieutenant George U. Morris.

About 1 P. M. the Merrimac was sighted coming out of the Elizabeth River, and the two sailing-ships at once prepared for battle, the course of the enemy being directed toward them after reaching

Sewell's Point. When distant nearly one mile, the Merrimac opened the engagement by firing her bow gun at the Cumberland, and the battle soon became general. The fire from a great number of guns of the two ships and from shore was concentrated upon the Merrimac, but from her sloping armor, made slippery by slushing with grease, the shot glanced off and did her no serious injury. Steaming slowly past the Congress, she turned toward the Cumberland and rammed that vessel under the starboard fore chains, breaking a large hole in her below water. Some of the reports say that she rammed the Cumberland twice, but this is doubtful. The shock of collision tore the cast-iron beak, or ram, off the bow of the Merrimac and thus greatly impaired her offensive qualities. She was also somewhat injured by the Cumberland putting one or two shells into her forward gun-port as she approached to ram, that, according to a statement made in a magazine article by one of the crew, killed two and wounded five men.

In spite of her fatal injury, the Cumberland continued to fight her guns as long as they were above water and gave as notable an example of heroism in disaster as is known to the annals of any navy. Though sinking slowly and suffering much from the fire of the enemy, her commander, Lieutenant Morris, scornfully refused to surrender, saying, "I will sink alongside first;" this he did about forty minutes after the ship was rammed,

the Cumberland going down gloriously with the American flag flying at the peak and her guns still firing. This was about 3.30 P. M. Many of her people, including the wounded, were carried down with the ship, and many others escaped by swimming to the shore. Of a total crew of 376 officers and men when the action began, 121 were reported as killed, wounded, or missing.

While the Cumberland was sinking, considerable of the fire of the enemy was diverted from her by the Congress and shore batteries. Owing to shoal water and the great draft of the Merrimac she was obliged to enter the James River a short distance above the batteries to *wind* or turn herself around in order to return to attack the Congress; this exposed her twice to the concentrated fire of the shore batteries, which, as reported by Captain Buchanan, did some damage and compelled him to direct much of his gun fire at the batteries in return. About the time that the Cumberland sank, the three steamers previously mentioned as being up the river came out at full speed past the batteries to join the Merrimac. They passed closer to shore than was expected, with the result that much of the cannon fire directed at them passed over and beyond. The Patrick Henry, however, was temporarily disabled by a shot striking a boiler or steam pipe, filling the engine and fire rooms with steam, driving every one on deck, and causing the engine to stop. Four firemen were scalded to

death and others wounded. The Jamestown towed her out of action until the engineers made connections to steam with the uninjured boiler, when she returned and joined in battle.

The Merrimac and her satellites now attacked the Congress, which vessel, though annoyed by the Beaufort and the Raleigh, had got under way in the interval with sails and with assistance from the tug gunboat Zouave, and had run ashore as near the batteries as her draft permitted. From a position close astern, the Merrimac fired into her with deadly effect, the small steamers also attacking and doing great harm; under this combined attack, which could be replied to by only a few guns, the Congress was obliged to haul down her flag and hoist a white flag as a token of surrender. This was between 4 and 4.30 P. M., the official reports of the event varying to this extent.

The Beaufort and the Raleigh were at once sent alongside to receive the surrender and take off prisoners, but they were driven off with loss by artillery and small-arm fire from shore; a lieutenant and a midshipman of the Raleigh were killed at this time, and it is said that several casualties resulted on board the Congress from the shore fire. It was thought by both Union and Confederate officers afloat at the time that the firing was by green volunteers who did not understand the situation nor the meaning of the white flag, but the report of the officer in command ashore states that

the firing was by his order, to prevent the Confederates from taking possession of their prize. A second attempt to board the Congress was made by the flag lieutenant of the Merrimac in a small boat, covered by the Teaser, but this was also repulsed by the fire from shore, the lieutenant and several of his men being wounded.

The Merrimac then, according to the report of Captain Buchanan, set the Congress on fire with hot shot and incendiary shell. The officer left in command of the Congress by the death of Lieutenant Smith states in his official report that the ship was on fire in several places before he surrendered. The driving away of the enemy gave the opportunity to man the boats and send the wounded ashore; many of her crew escaped to the shore by boats or by swimming, and some were drowned in the attempt. The only prisoners taken off the Congress were about twenty-five men who got on board the Raleigh when she was alongside. Accounts differ as to whether these were wounded men moved first out of the prize, or were men who voluntarily jumped on board the Raleigh to escape from the firing of their friends on shore. The Congress had at the beginning of the engagement 434 officers and men on board, and her total loss in killed, wounded, and missing was 136, or about one third of the entire crew. Included in the whole number on board as just stated were two officers and eighty-seven men of Company D, Ninety-Ninth New York

Volunteer Infantry, put on board two months before to make up deficiencies in the crew. This company had its full share of casualties, nine men being killed and fifteen wounded, while seven were reported missing. The Congress burned furiously until after midnight, her destruction being completed by the explosion of her magazine about half an hour after midnight.

Captain Buchanan of the Merrimac was disabled by a Minié ball from shore about the time that the Congress surrendered, and the command devolved upon the executive officer. As Captain Buchanan was the foremost figure produced by the Confederate States navy it is proper to refer briefly to his career. Franklin Buchanan was born in Baltimore in 1800 and was appointed a midshipman in the navy from Pennsylvania in 1815; he became a lieutenant in 1825; a master-commandant in 1841, and a captain in 1855. He was largely instrumental in founding the U. S. Naval Academy at Annapolis, and was its first superintendent, from 1845 to 1847. His services in the war with Mexico and in the famous expedition of Commodore Perry to Japan were conspicuous. At the outbreak of the Civil War he was commandant of the navy-yard at Washington, and resigned his commission from the United States navy. Later in that year, when he found that his native state, Maryland, did not secede he tried to recall the resignation, but was refused; he then

entered the navy of the Confederate States. The office of admiral of that navy was created for him in recognition of his services on the Merrimac, and with that rank he afterward commanded the Confederate squadron in the battle of Mobile Bay, where he was again wounded, and defeated by Admiral Farragut. His standing in the old navy was such that had he remained with it he might have become its most distinguished officer. After the war he was for several years president of the Maryland Agricultural College; his death occurred in 1874.

Other considerations than the attack from shore and the wounding of her captain called the Merrimac away from the stranded Congress. While the fight off Newport News was in progress there was great activity in the shipping at Fortress Monroe, and the war-vessels there got under way to join in the combat, with all haste. The Minnesota, under her own steam, arrived within about a mile of the scene and went hard aground just as the Cumberland was sinking. After attacking the Congress, as described, the Merrimac and two of the gunboats withdrew their attention to the Minnesota, but the ironclad could not approach within a mile of her because of shoal water, and could not inflict much damage with her guns at that distance. The two gunboats, however, took positions off the port bow and stern of the Minnesota and did her considerable injury, besides

killing and wounding nineteen men. They were finally driven off, but the Merrimac continued the battle at long range until 7 P. M., when darkness and the falling of the tide compelled her to withdraw to an anchorage between Sewell's Point and Craney Island.

Meanwhile the Roanoke and the St. Lawrence had obtained aid from steam tugs and proceeded slowly up to the scene of battle. The Roanoke, towed by the Young America and the Dragon, grounded when still too far distant to join in the action; she was soon afloat again and, seeing the uselessness of trying to get nearer, returned to Ft. Monroe, after dispatching her tugs to the aid of the Minnesota. Her only part in the battle was the exchange of shots with the batteries at Sewell's Point, which attacked her both going and returning. The St. Lawrence, towed by the armed screw steamer Cambridge, was more fortunate in getting near the enemy, but she also grounded near the Minnesota, where she arrived about 6 P. M. She at once engaged the Merrimac by firing broadsides at her, and received a severe gun fire in return. Her principal injury was from a large rifled shell that wrecked the after part of her wardroom but did not explode; she had no casualties. When the Merrimac ceased the combat, the St. Lawrence was floated by the Young America and towed back to Old Point. The Cambridge participated in the engagement, as did also another auxiliary gunboat,

the Whitehall. The latter was a small New York ferry-boat, mounting four guns only, and had no business in such company; she was struck by a shell from the Merrimac that killed one officer (an assistant engineer) and two men and wounded another man.

When the battle ended, the Merrimac and her consorts had won a remarkable victory against great numerical odds, and were in complete control of the situation. The results of the attack were nearly 300 men placed *hors de combat* on the Federal ships; two large sailing ships of war, until that day thought formidable, totally destroyed; the Minnesota badly damaged and in great peril; other ships suffering from lesser injuries; and a widespread alarm which not only prevailed among the ships in the vicinity but extended to the national capital and to the chief seaboard cities of the Union. In accomplishing all this, the Merrimac had lost two men killed and eight wounded; the muzzles of two of her guns had been shot off; her ram was lost, the prow twisted, and the armor somewhat damaged; the anchors, boats, and flagstaffs were shot away, and the smokepipe was riddled. The injury to the smokepipe was a serious one, as it much impaired her ability to steam, which was bad originally. The injuries sustained by the Patrick Henry and the Raleigh have already been mentioned.

News of the disaster caused wild dismay in the

governmental departments in Washington, which city was a natural objective point of the enemy, and some of the projects for defense, and even flight, proposed by high officials would seem ludicrous now if we could not analyze the real gravity of the situation. A great army was at that time being massed in Virginia for a campaign that, it was hoped, would quell the rebellion; and the real importance of the Merrimac's achievement is shown, better than by any other evidence, by the way it impressed the officer commanding that army. Telegraphing the next day, General McClellan said: "The performances of the Merrimac place a new aspect upon everything. I may very probably change my whole plan of campaign just on the eve of execution."

This day's battle gives the real date of the dividing line between the old and the new in naval constructions. It revolutionized the navies of the world, and showed that the dominion of the seas by means of wooden sailing-ships had come to an abrupt ending. The event of the next day has generally been given the greater importance in this regard, but it was not needed to demonstrate the triumph of iron and the overthrow of the long-famed wooden walls. It served only to drive the lesson deeper home, beyond contradiction, to set all maritime powers to immediately reconstructing their navies, and to condemn as useless the great fighting fabrics that for so long had been regarded

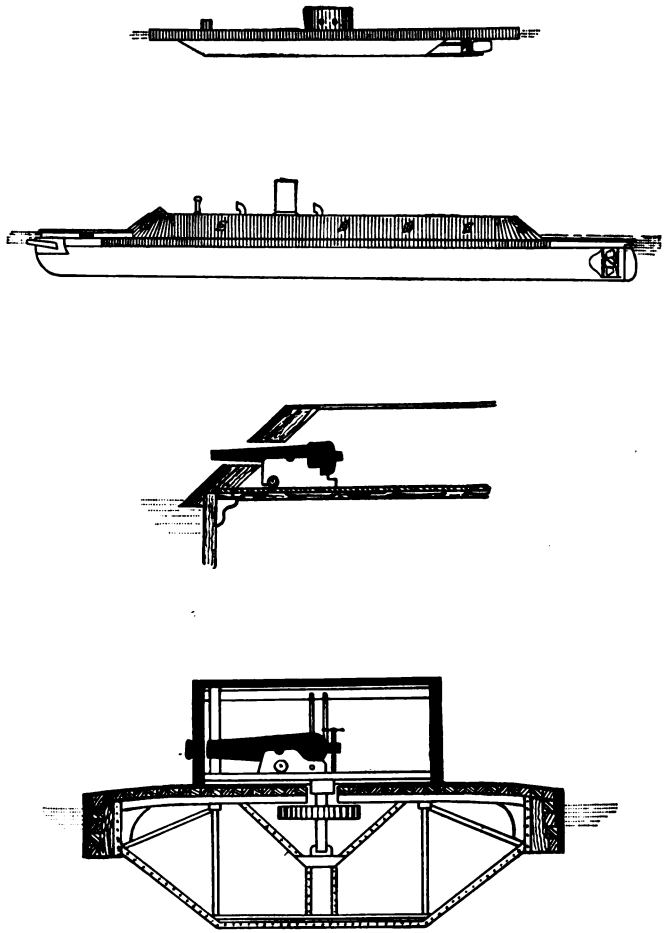
as the absolute war-lords of the ocean. It ushered in the full dawn of the day of iron and steel, of engines and engineers, in naval affairs, and started the stately old three-decker on her last long voyage to the "Islands of the Blest."

We must now return to the Monitor and bring her to the scene of action. Her final and satisfactory trial trip took place March 4. Two days later, hurried by frequent orders from Washington, she put to sea, bound for Hampton Roads, convoyed by the gunboats Sachem and Currituck, and in tow of the steamer Seth Lowe, though she used her own engines also. Two hours after her departure a telegraphic order arrived for her to proceed direct to Washington, and this order was repeated to Captain Marsden, the senior officer at Hampton Roads. In this incident historians have found an interesting parallel to the case of the frigate Constitution, that boldly went to sea just before a change of orders came, and won such a victory from the most powerful navy in the world that new heart was given to the people of the United States, and our right to the freedom of the ocean was established.

The officers and men of the Monitor volunteered for that service instead of being arbitrarily ordered, as would have been the case in assignment to any other naval vessel. This was because of the complete novelty of the ship and distrust of her sea-going qualities, expressed so openly by seamen and

landsmen that the venture seemed as desperate as service in a submarine boat would be considered now. The officers were Lieutenant John L. Worden, in command; Lieutenant S. Dana Greene; Acting Masters John J. N. Webber, and Louis N. Stodder; Assistant Surgeon D. C. Logue; Assistant Paymaster W. F. Keeler; First Assistant Engineer Isaac Newton, acting as chief engineer; Second Assistant Engineer A. B. Campbell; Third Assistant Engineers R. W. Hands and M. F. Sundstrum; and Mr. Daniel Toffey, captain's clerk.

Chief Engineer Alban C. Stimers, previously mentioned as the superintendent of construction of the ship, went to sea in her by authority of the Navy Department, to give the officers and men the benefit of his knowledge, and to observe the behavior of the vessel and machinery. He had seen every detail of the ship built and put together, and he had personally operated every machine on board, gaining in this way experience that was invaluable, and enabled him to contribute more to the successful performance of the vessel than was possible for any other person on board. This is truthfully said without disparagement of Lieutenant Worden, who, as commander, directed all general operations and controlled the fate of his command, but who could not compel obedience from refractory machinery that he did not understand, even if his success or failure depended upon



THE MONITOR AND THE MERRIMAC

Comparison of Size and Armor Sections

turret would have been inconsiderable and easily handled by the pumps. The base of the turret rested heavily upon a bronze ring let into the deck, leaving scarcely any crack through which water could force its way. Before the vessel left the navy-yard, however, some "expert," familiar with the manifold uses of rope on shipboard, had had the turret wedged partly up and caulked the wide crack thus opened with rope gaskets. When seas began to beat violently against the turret, these gaskets were washed out, leaving a wide annular opening sixty-three feet in circumference, through which water poured in cascades into the ship.

Further trouble came from the trunks provided for smoke-exits and blower-supply pipes: these were so low that the waves frequently broke clear over them, choking the blowers with water and impairing the fires in the boilers. The belts of the blowers got wet from this cause, and slipped so that fresh air for the furnaces could not be supplied, and the engine and fire rooms became filled with noxious gases from the coal fires. In their efforts to get the blowers in operation, some of the engineers and firemen were overcome by the gas and were carried to the top of the turret, presumably dead, but they revived after a time in the fresh air. Without the blower supply of air the fires and steam became so low that the pumps stopped altogether; and in the full expectation of

foundering, the Monitor was towed in toward the shore. After several hours of peril, smoother water was reached, the machinery started again, water pumped out, and the voyage resumed. It was then evening of March 7. Fair progress was made for a time, but soon after midnight more danger and trouble came, as expressively described by Lieutenant Greene in a letter written home soon afterward.

"We were just passing a shoal, and the sea suddenly became rough and right ahead. It came up with tremendous force through our anchor-well and forced the air through our hawse-pipe where the chain comes, and then the water would rush through in a perfect stream, clear to our berth deck, over the wardroom table. The noise resembled the death groans of twenty men, and was the most dismal, awful sound I have ever heard. Of course the captain and myself were on our feet in a moment, and endeavored to stop the hawse-pipe. We succeeded partially, but now the water began to come down our blowers again, and we feared the same accident that happened in the afternoon. We tried to hail the tugboat, but the wind being dead ahead they could not hear us, and we had no way of signaling them, as the steam whistle which father had recommended had not been put in.

"We began to think the Monitor would never see daylight. We watched carefully every drop of water that went down the blowers, and sent

continually to ask the fireman how they were going. His only answer was 'Slowly,' but could not be kept going much longer unless the water could be kept from coming down. The sea was washing completely over the decks, and it was dangerous for a man to go on them, so we could do nothing to the blowers. In the midst of all this our wheel-ropes jumped off the steering-wheel (owing to the pitching of the ship), and became jammed. She now began to sheer about at an awful rate, and we thought our hawser would certainly part. Fortunately it was new, and held on well. In the course of half an hour we freed our wheel-ropes, and now the blowers were the only difficulty. About three o'clock Saturday A. M. the sea became a little smoother, though still rough, and going down our blowers somewhat."

The next morning (March 8) the sea was smoother and the weary voyage progressed slowly, but free from serious danger. About 4 P. M. the Monitor entered in at the Capes of Chesapeake, and there heard from afar the guns of the conflict then raging at Newport News. An hour or two later definite information of the great disaster that had befallen the United States navy was obtained from an out-going pilot-boat. About 9 P. M. the Monitor arrived in Hampton Roads and Lieutenant Worden reported in person to Captain Marsden on board the Roanoke.

In view of the events of the day there was no

doubt as to what was the duty of the Monitor; the order for her to go on to Washington was of course disregarded, and she was directed to go to the Minnesota to defend that ship if possible from the attack that would surely be made in the morning. A number of Chesapeake pilots refused to take the Monitor to Newport News, giving the absurd excuse that they did not know the channel. This embarrassment was relieved by Acting Master Samuel Howard of the navy, attached to the armed bark Amanda, who fortunately was familiar with those waters and had faith enough in the Monitor to risk his fate in her voluntarily. In the battle of the ensuing day he was with Worden in the pilot-house. Not long after midnight the Monitor anchored close to the Minnesota, and her wearied crew at once began preparing the vessel for the fight that must come with the morning. The sounds of heavy hammering that came from her in the dark hours before dawn, as the adjustments for battle progressed, gave forcible notice that the engineer had at last come upon the stage of naval warfare.

There is an end of all things, and morning finally relieved the dreadful suspense of the night. It was Sunday, which by a series of great events has come to be the battle-day of the navy of the United States. Besides the struggle in Hampton Roads with which we are now concerned, other notable Sunday triumphs of our navy that come

to mind are the bloody victory of the frigate United States over the Macedonian; the sinking of the Alabama by the Kearsarge; the remarkable victory of Admiral Dewey in Manila Bay; and Admiral Sampson's great sea-fight — the greatest in results since Trafalgar — in the deep blue waters off Santiago de Cuba.

The Merrimac got under way shortly before 8 A. M. and steamed down below Sewell's Point far enough to enable her to turn into the channel by which the Minnesota had proceeded to Newport News. The wound of Captain Buchanan had proved so serious that he had been sent ashore to the hospital, leaving the executive officer, Lieutenant Catesby ap R. Jones, in command, as he had been during the latter part of the day before. Turning down the main ship-channel, the Merrimac slowly approached the Minnesota, the Confederate gunboats meanwhile stationing themselves in the vicinity of Sewell's Point, ready to contribute whatever they could to their cause.

When the Minnesota and Merrimac were about a mile apart, firing began between them, and the Monitor, in obedience to signal from the former, at once steamed out between the two and engaged the Merrimac. There is some doubt, after a comparison of the official reports, whether the Confederates knew beforehand that they were to encounter the Ericsson battery, but they probably did. It is certain that they saw her early in the morning,

and the well-informed must have recognized her from the descriptions that newspapers had furnished friend and foe alike. In some of the Confederate reports it is stated that they supposed the strange-looking object to be a water-tank sent to supply the Minnesota, or a floating magazine bringing her ammunition. Lieutenant Jones, however, says that at daylight he saw the Minnesota was still aground, and that there was an iron battery lying near her.

All doubt about the stranger was dispelled by the heavy impact of her 11-inch solid shot against the casemate of the Merrimac, starting it inward, knocking men off their feet by the shock, and leaving them stunned, and bleeding at the nose, mouth, and ears. The first shot fired at the Monitor missed her, and the enemy realized that they did not have the big hull of a frigate for a target. It is not necessary to go into all the details of a combat that is so historic and so well known. Speed is a word hardly applicable to either combatant, but the great advantage of quicker movement was with the Monitor. The Merrimac, whose steaming power was much impaired by the damage to the smoke-pipe inflicted in the action of the day before, was also much hampered by her deep draft in a contracted channel, and had to be very slow and careful in her movements. She was, in fact, aground once, early in the action, and remained so for fifteen minutes. Her pilots

also are reported as having been remarkably cautious and not at all anxious to get the ship at close quarters with a formidable enemy.

The Monitor's projectiles knocked off the armor bars freely from the casemate of the Merrimac and broke the wooden timbers underneath, but none actually penetrated. Many smaller shot from the Minnesota also struck her, but they glanced off the sloping armor as harmlessly as they had done the day before. The only solid shot the Merrimac had were of large windage, intended to be fired hot; so she was compelled to use shells only, with which she had been supplied when it was supposed she would encounter nothing but wooden ships. These shells had small effect on the Monitor beyond making dents in the turret and decks, and their impact did not derange the turret-turning mechanism, as had been greatly feared. An attempt to ram the Monitor was eluded by the superior agility of that vessel, a glancing blow only being struck that did no injury to her, but did damage the Merrimac by starting a leak in her already weakened stem. On board the Monitor, the location of the pilot-house on deck forward was found to be a great disadvantage, as it prevented firing the guns ahead and separated the handling and fighting intelligences of the ship. In subsequent monitors both these objections were overcome by the simple device of putting the pilot-house on top of the turret.

The Merrimac fired often at the Minnesota and did considerable damage to that ship, but the presence of the Monitor so occupied her attention that the otherwise certain destruction of the stranded frigate was prevented. One shell entered the chief engineer's room on the Minnesota, tore several rooms into one, and in bursting exploded two charges of powder that set the ship on fire. Another shell exploded the boiler of the tugboat Dragon, lying alongside the Minnesota trying to get her afloat, seriously wounding three men, and completely destroying the inside of the wheel. The Confederates very properly claimed this damage to the Dragon as one of the results of the Merrimac's raid, but they were in error in claiming the destruction of the Whitehall, also alongside the Minnesota at the time. The Whitehall had been in the battle of the day before and had lost some men, as before mentioned, but had not suffered any material damage from the enemy. On the morning of March 10, at least twelve hours after the Merrimac had returned to Norfolk, the Whitehall accidentally took fire while lying at the wharf at Fortress Monroe and was completely destroyed. She had on board a quantity of equipment and gun-gear taken from the Minnesota when it was feared that vessel would have to be abandoned, and this also was burned.

The battle continued without advantage to either combatant. At one time the Monitor had

to draw out of action to hoist shot into her turret, which it appears could not be done while the turret was in use. This cessation of hostilities, which lasted only fifteen minutes, greatly encouraged the Confederates, who thought their enemy disabled, and caused gloom and despair on board the Minnesota under the same supposition. About this time the Minnesota was virtually abandoned; part of the crew was sent on shore and the remainder, except the few who were to apply the torch to her, were in boats alongside ready to leave. The quick resumption of the fight by the Monitor dispelled the illusions on both sides and eventually saved the Minnesota, for the work of destroying her was stayed, and soon after converted into a successful effort to float and save her.

About 11.30 A. M., when the ironclads were not more than fifty yards apart, Lieutenant Worden was disabled, while looking through a peephole in the pilot-house, by a shell striking and exploding right in front of his eyes. He was temporarily blinded and his face badly burned and cut by flying bits of powder and iron. The helmsman was also stunned for a few minutes by the concussion, and in that short time the Monitor, with no one in control to steer or signal the engine-room, ran off aimlessly away from the fight. Very soon, however, Greene learned of the casualty in the pilot-house, and leaving Stimers in charge of the turret, took command of the ship and began firing

ACTION BETWEEN THE MONITOR AND THE MERRIMAC

action, and fired forty-one 11-inch solid shot. The most severe blow she received was from the shell that disabled Worden, this having broken one of the big iron "logs" of which the pilot-house was built, entirely through, and forced the fractured ends inward an inch and a half, besides displacing the loose iron cover of the pilot-house. The deepest indentation in her turret was two inches, and the deepest score in the deck was only one-half inch. Two men in the turret were temporarily disabled by being in touch with the iron wall when it was struck; these two and Worden were the only persons injured on board. The Merrimac had about forty men prostrated by concussion, but their injuries were mostly of a temporary nature. In the official report of Lieutenant Jones, the loss of the Merrimac in the two days' fight is given as two men killed and nineteen wounded; as he had reported on the evening of March 8 that he had lost two men killed and eight wounded in the fighting of that day, it follows that eleven of his men were sufficiently injured in the combat with the Monitor to figure in the list of casualties. Of nearly one hundred shot-marks on the armor of the Merrimac, twenty were identified as having been made by the 11-inch guns of the Monitor. The greatest injury to the Merrimac was the leak caused by ramming first the Cumberland, and afterwards the Monitor; that this was very serious is established by the fact that the ship was put in

dry dock that same afternoon, as soon as she arrived at Norfolk.

Much has been said and written since that eventful day in dispute as to which of the ironclads was the victor, though the official reports from both sides leave no room for doubt. Had the battle been simply a trial of strength between them, had they come out from their respective lines, like David and Goliath of old, to submit the issue to the test of personal combat, the result — if result it may be called — must be decided as a draw. Neither was disabled, and neither vanquished the other. The real issue, however, was much broader than the mere question of endurance of the two armored ships. The task of the day chosen by the Merrimac was to destroy the Minnesota, to clear Hampton Roads of hostile ships, and to open a free seaway for herself for wider operations. The task of the Monitor was to prevent the execution of this design, which she did with complete success by checking the enemy at the very first stage of his programme. Baffled in the attack upon the Minnesota, the Merrimac abandoned the field and left her enemy in possession; instead of destroying the Federal ships, she did not destroy anything, and at the end of the day was not even in their presence. The duty assigned to the Monitor was to protect the wooden ships, and she protected them; when night fell, she was still on guard over them, grim, ugly, and ready to fight.

The only conclusion to be drawn from these facts is that the Monitor won a decided victory over the Merrimac.

The success of the Monitor completely changed the aspect of the opening military campaign, and raised the North from the depths of apprehension to a pinnacle of hope and celebration. No single event of the Civil War, as has been often said, so excited popular enthusiasm, and the Monitor furnished for a long time material for public discussion and applause. The officers — Worden, Greene, and Stimers, particularly — found themselves suddenly popular heroes, and in all this adulation it is pleasant to know that the real author of all the success, John Ericsson, was not overlooked. He who had been looked at with suspicion as an "inventive crank" was now overwhelmed with honors, and recognized as a national benefactor, and the foremost engineer of his time.

The story of the battle created a profound sensation abroad, and established a respect for the naval power of the United States that was much needed just at that time. European nations whose commercial interests were suffering because of the war in America were constrained to check their almost openly avowed intentions of meddling with our affairs, because it suddenly appeared that an element of danger, until then unsuspected, would attend such interference. This discovery was well

expressed by the "London Times," which said editorially: "Whereas we had available for immediate purposes one hundred and forty-nine first-class war-ships, we have now two, these two being the Warrior and her sister Ironside. There is not now a ship in the English navy, apart from these two, that it would not be madness to trust to an engagement with that little Monitor."

It is doubtful if any naval conflict in the history of the world ever attracted such widespread attention as did the battle between the Monitor and Merrimac, because the peculiar character and results of the struggle forced new and vital problems upon all naval powers. The essential lesson of the whole affair was demonstrated by the operations of the Merrimac in her first day's work: these proved beyond all discussion that the sailless armored steamer must supplant the wooden sailing-ship; the next day showed that the armored steamer could be met and checked by its own kind. The revolution in naval architecture that has produced the great battleships of the present day began at once in all parts of the world.

It will be appropriate before concluding this chapter to review the short and tragic histories of the two ironclads after their famous encounter. The Merrimac, while in the dry dock at Norfolk after the battle, was repaired as much as great haste allowed. Her damaged armor plates were replaced, and the armor was extended deeper below

the water-line; a new ram, or spur, was fitted to the bow, and port-shutters were provided for some of the gun-ports. This work was pushed night and day, and was hastened by almost hourly telegrams from Richmond urging expedition and threatening punishment to any official lacking in energy or ability. It is even said that women and children aided in the work by holding torches and lanterns for mechanics to work by at night. April 4 the ship was floated out of dock, though not fully completed, and an aggressive policy against the enemy at once decided upon. Captain Josiah Tattnall, of "Blood is thicker than water" fame, was appointed to the command in place of Buchanan, whose wound had proved very troublesome, and much was expected.

On the morning of April 11, the Merrimac, with the Jamestown and some of the other improvised gunboats, steamed down into Hampton Roads with the intention of offering battle to the large force of Federal war-vessels and transports lying there, and more particularly to attempt the capture of the Monitor. With this object in view, a plan had been decided upon to board her with a party of men equipped for particular service; some were provided with heavy hammers and iron wedges to disable the turret by driving the wedges into the crack between the bottom of the turret and the deck; others were armed with combustibles to throw down the smoke-holes and blower-openings, and

another party was detailed to throw a wet sail over the pilot-house and thus make steering impossible by cutting off the range of vision of the helmsman. She passed below Sewell's Point, and, in the afternoon, fired a few shots at impossibly long range at the Monitor, lying at anchor near Fortress Monroe. Return firing at equally futile range was indulged in by the Naugatuck and Octorara, but effort seems to have been lacking to close in and engage the Confederate squadron seriously. In the face of the Federal force, the Jamestown and Raleigh crossed Hampton Bar and captured two American brigs and a schooner, empty and lying at anchor, and towed them away as prizes without molestation.

This day's proceeding is quite incomprehensible to any one familiar with the dash and intrepidity that all our history shows to be attributes of officers of the United States Navy. A plan had been agreed upon to attack the Merrimac whenever she should appear and attempt her destruction by running her down or over-riding her with large merchant-steamers that had been chartered and specially prepared for that purpose. The Monitor was present, at anchor it is true, but with steam up and ready to fight if ordered, and the Naugatuck was also an ironclad supposed to possess formidable characteristics; she was a small steamer that had been fitted out by the Stevens brothers of Hoboken, to demonstrate the features of their

armored battery that they were trying to dispose of to the government. The flag officer in command at Hampton Roads, Captain L. M. Goldsborough, in reporting the affair, mentioned the capture of the three small merchant-vessels as the only important incident, and said that had the Merrimac engaged the Monitor, "which she might have done," to use his own words, he was prepared with several vessels to run her down. Altogether, the affair is difficult to understand.

Again, on May 8, the Merrimac appeared for a short time in the vicinity of the Federal ships. On that date the Monitor, Dacotah, Susquehanna, Seminole, and Naugatuck shelled the Confederate batteries at Sewell's Point, to test their strength and to ascertain the possibility of landing troops in that vicinity. The Merrimac came out at once, but nothing happened. The reports are conflicting: Captain Tattnall says that the Federals retired before his approach, and Captain Goldsborough says that the Merrimac "did not engage the Monitor, nor did she place herself where she could have been assailed by one of our ram vessels to any advantage, or where there was any prospect whatever of our getting at her." The commander of the British man-of-war Rinaldo, present at the time, perhaps not a wholly unprejudiced observer, reported to his government that no attempt was made to molest the Merrimac, except a few shots fired at her from the Rip Raps (the fort in the

channel at Old Point), and that she drove the Federal ships away.

The military situation was then critical for the Confederates in that vicinity, and two days later, May 10, the city of Norfolk was abandoned to the Union forces. An attempt was made to save the Merrimac by taking her up the James River, but she was found to draw too much water, and Tattnall in his extremity had to run her on shore near Craney Island and destroy her by fire to prevent her falling into the hands of his enemy; the fire reached her magazine, and she blew up early in the morning of May 11. The Southern public had counted on so much from the Merrimac and had such an exaggerated idea of her powers that this loss occasioned a fierce outburst of grief and for a time threatened mob violence to the government offices in Richmond. To gratify popular clamor, Captain Tattnall was tried by court-martial, but was honorably acquitted, as it was shown that his action was the result of dire necessity and the only step possible to prevent his ship from capture and use by the Federals. His argument in defense is a long and peculiarly interesting document, couched in the stately forensic phrase of a by-gone day, still in use to some extent at the South. It reviews with minuteness of detail all his actions and his controlling surroundings while in command of the Merrimac, and concludes with a paragraph that is worthy of repetition to a

younger generation, for its application is general and pertinent at any time when men in high military position are judged by the public only upon the standard of success, without regard to unknown obstacles: —

"Thus perished the Virginia, and with her many high-flown hopes of naval supremacy and success. That denunciation, loud and deep, should follow in the wake of such an event, might be expected from the excited mass who, on occasions of vast public exigency, make their wishes the measure of their expectations, and recognize in public men no criterion of merit but perfect success. But he who worthily aspires to a part in great and serious affairs must be unawed by the clamor, looking to the right-judging few for present support, and patiently waiting for the calmer time when reflection shall assume a general sway, and by the judgment of all, full justice, though tardy, will be done to his character, motives, and conduct."

Immediately following the surrender of Norfolk, the Monitor, as one of a squadron of small vessels under the command of Captain John Rodgers in the Galena, proceeded up the James River to within about eight miles of Richmond. She participated in the fight there May 15, at Drewry's Bluff, on which occasion the Galena was so roughly handled, as mentioned in the preceding chapter, and was struck three times by the enemy's pro-

jectiles; the damage was of no consequence, and no one on the Monitor was injured. Thereafter, until late in September, she was an active member of the James River squadron, and had many brushes with the shore batteries of the enemy at various points along the river banks. In September she went to the navy-yard at Washington for repairs to fit her for a sea voyage and for further service.

When again ready for service, the Monitor, in company with a newly built monitor of improved type, the Passaic, left Hampton Roads the afternoon of December 29, 1862, as the initial move in a plan for investing with ironclad vessels the harbor and city of Charleston. Both monitors were under their own steam, but were in tow as well, the Monitor by the Rhode Island and the Passaic by the State of Georgia. A rough sea was encountered in the vicinity of Cape Hatteras, and the Monitor began leaking and taking in water about the turret and through the hawse-pipes to such an extent that the pumps could not discharge it. It being evident that the vessel must founder, signals of distress were made, and the work of transferring the crew to the Rhode Island undertaken. Before all were taken off, the Monitor sank. This occurred shortly after midnight in the morning of December 31, 1862, at a point about twenty miles south-southwest of Cape Hatteras. With the Monitor perished two

ensigns, two assistant engineers, and twelve enlisted men.

Commander Bankhead, her captain, stated in his report of the disaster that the Monitor must have sprung a leak somewhere in the forward part, where the hull joined on to the armor, and that it was caused by the heavy shocks received as she came down upon the sea. A glance at the drawings showing the structural features of the ship will show that this belief was probably correct. The shrinking of timbers in the upper body, a result of the long hot summer's work in James River, may have been a cause of leakage also. The Monitor, in spite of her brief career, achieved one of the most conspicuous positions in all recorded naval annals. For this reason, it is proper in concluding her history to give with exactness the particulars attending her destruction. These cannot, perhaps, be presented in better detail than appears in the official report by which the commander-in-chief of the North Atlantic Blockading Station informed the Navy Department of the disaster: —

"Commander J. P. Bankhead, commanding the Monitor, reports to me that he left the Roads Monday 29th ultimo, at 2.30 P. M., with light southwest wind, clear, pleasant weather, and every prospect of its continuing so. At 6 P. M. he passed Cape Henry; water smooth, and everything working well. The same good weather con-

tinued during the night and until 5 A. M. on Tuesday, the 30th, when the Monitor felt a swell from the southward and a slight increase of wind from southwest, the sea breaking over the pilot-house and striking the base of the tower; speed about five knots. Until 6 P. M. the weather was variable, with occasional squalls of wind and rain, with less swell in the afternoon. Bilge-pumps were amply sufficient to keep her free. At 7 P. M. the wind hauled more to the southward, increased and caused sea to rise, the computed position being fifteen miles south of Cape Hatteras. At this time the Monitor was yawing and towing badly, the vessel working and making more water; the Worthington pumps were set to work, and the centrifugal pumps got ready. At 8 P. M. the sea was rising rapidly (the Monitor plunging heavily), completely submerging pilot-house, and at times entering the turret and blower pipes. When she rose to the swell, the flat under surface of the projecting armor would come down with great force, causing considerable shock to the vessel. Stopping the Rhode Island, which was towing her, did not make the Monitor ride easier or cause her to make less water, as she would then fall off and roll heavily in the trough of the sea. The centrifugal pump was at length started, the others failing to keep the water down. With all pumps working well, the water continued rising, and at 10 P. M., after a fair trial of the pumps,

and the water still gaining rapidly, Commander Bankhead made signal of distress, cut the hawser, steamed close to and under the lee of the Rhode Island, received two boats from her, and ordered the crew of the Monitor to leave her, — a dangerous operation, as the sea was breaking heavily over the deck. The two vessels touched, and, owing to the sharp bow and sides of the Monitor, the Rhode Island was endangered, and she steamed ahead a little. At 11.30 P. M. the water was gaining rapidly, though all the pumps were in full play, the engine working slowly and the sea breaking badly over the vessel, making it dangerous to leave the turret. At this time, several men were supposed to have been washed overboard. The engine and pumps soon ceased to work, the water having put the fires out. While waiting for return of boats, bailing was resorted to. As the Monitor was now laboring in the trough of the sea, Commander Bankhead let go the anchor which brought her head to sea. The vessel filling rapidly, Commander Bankhead ordered the twenty-five or thirty men, then left on board, to leave in the boats then approaching cautiously, as the sea was breaking violently over the Monitor's submerged deck. In this perilous position, Commander Bankhead held a boat's painter until as many men could get in as the boat could carry. Some men left in the turret, terrified by the peril, declined to come down, and are supposed to have

perished. Commander Bankhead did not leave his vessel so long as he could do anything towards saving his crew, in which efforts he was ably assisted by Commander Trenchard, the officers, and crew of the Rhode Island."

CHAPTER III

SOME NAVAL EVENTS OF THE CIVIL WAR

THE Civil War in the United States furnishes the first instance in history of prolonged and extensive naval operations carried on with steam vessels only. The instances of the use of sailing-ships in the prosecution of the war are few, are without important results, and are confined to the events of the first year, so the statement that steam was the only motive power of the navy during that war is practically accurate. At the outbreak of the war there were but thirteen sailing-vessels of the navy in commission for service, and only four of these were attached to the North Atlantic, or home, squadron: the others were in the East Indies, in the Pacific, on the Brazil station, or enduring the monotony and exile of the west coast of Africa, where, in coöperation with British ships of war, they were cruising for the purpose of suppressing the slave trade.

As they came home, some were assigned to cruising or blockading duty off the coast of the Southern States, but they were admittedly so inferior to steamers for that service that as fast as the

latter could be obtained by purchase or construction the sailing-ships were withdrawn, and assigned to less active and dangerous duty. A few of them participated in actual hostilities in the early days of the war, as the Cumberland, for instance, which was in squadron with a number of steamers that attacked and captured the forts at Hatteras Inlet in August, 1861, and the sloop-of-war Vandalia that, in tow of a steamer, used her battery to good effect on the forts at the entrance to Port Royal in the naval battle of November 7 in the same year. During that first year of the war also the brig Perry, acting singly, captured a Confederate privateer, the Savannah, and the sailing-frigate St. Lawrence attacked and sank another privateer named Petrel. The most important encounter in which sailing-ships were engaged, in which the Congress and Cumberland were destroyed and the St. Lawrence injured, has already been described. That was the farewell appearance in battle in our navy of that historical and picturesque type of warship, the disappearance of which is still mourned by some who believe that much of the romance of warfare on the water took flight with them.

The large steam frigates and sloops-of-war built a few years previously constituted the backbone of the navy during the years of the Civil War. They were fully armed and equipped ships of war that had been in service long enough to have their defects discovered and remedied, and as flagships of

squadrons, or senior officers' ships in special expeditions, were the standards about which the newer naval force of armed merchant craft or hastily-built war-steamers rallied. The latter were of many kinds, as the peculiar exigencies of the war demanded: many were monitors, or imitations of monitors, inspired by the event of Hampton Roads; curious forms of ironclads were found best suited to the conditions of service on the Mississippi River and other inland waters; there were a great number of small gunboats for blockading and general service, called "ninety-day" gunboats from the rapidity with which they were built and the circumstance that a number of them were actually in action within little more than three months after their keels were laid. The ascent of hostile rivers too narrow to permit of a vessel turning around led to the creation of a peculiar class of gun-vessels known as "double-enders," from the fact that the bows and sterns were exactly alike, with a rudder at each end, and paddle wheels centrally located with reference to the length; though encroaching upon the battery space, the side wheels were necessary that the vessels might be of very light draft for river service. Altogether there were built forty-seven of these double-enders, and much useful work was had from them; but one, — the Monocacy, — now employed for more than thirty years in the waters of China and Japan, survives of all this class.

There were also a number of large steam sloops-of-war built at the beginning of the war and completed early enough to take a prominent part in it. They were not much smaller than the Hartford, and as they were built of seasoned timber on hand before the outbreak of hostilities they lasted for many years; and eventually, as the navy was neglected and allowed to go to ruin after the war, they came to be the principal vessels in it. The names of some of the best known of these were Juniata, Oneida, Kearsarge, Tuscarora, Canandaigua, Lackawanna, Monongahela, Ticonderoga, and Shenandoah. These and many other sonorous and distinctively American names have now practically disappeared from our navy, which is greatly to be regretted, as they proclaimed the nationality of the vessels bearing them and served to make known throughout the world and perpetuate the beautiful and euphonious words that the vanished tribes of American aborigines bestowed upon their hills and forests, rivers and lakes.

Besides the various classes of war-vessels added to the navy to meet the emergency, almost every steam vessel owned in the United States that was at all suitable was bought, armed, and sent out to do its best as a man-of-war. Some of these were fairly large ocean-going steamers; others were freight-carriers, harbor and river tugs, and even ferry-boats, all ill-adapted to the uses required, but the best that could be done, and the best that can

be expected in our country, where the solemn and imperative obligation of preparing for war in time of peace is so habitually disregarded. All were steamers, however, and the long war in which they participated was, as before observed, essentially a steam war in its naval features.

There is a preconceived notion on the part of the public that naval engagements should be confined to the open sea and deep water. Because of this mistaken belief, some of the most important naval operations of the Civil War have never attracted the interest they deserved, as they took place in shallow coast waters, or in rivers remote from the sea. This is particularly true of the services of the navy on the Mississippi River and its tributaries, where the location was such in reference to the States forming the western section of the Confederacy that naval success influenced in large degree the conduct of the war. The capture of Forts Henry and Donelson in February, 1862, brought General Grant into prominence and furnished the hastily-built river gunboats their first opportunity for active service. In the case of Fort Henry, the land force was delayed by bad roads, and the surrender was actually made to the gunboats, under Captain A. H. Foote of the navy, after a bombardment of an hour, before the arrival of the troops. This cannot be claimed as a naval victory, however, as the river gunboats at that time, though commanded by officers of the navy, were under the

control of the army and operated as a part of it. This anomaly was removed in July of the same year by an act of Congress transferring the river flotilla to the navy.

A naval enterprise on a much greater scale, having the opening of the Mississippi River for its object, was already in process of formation at the time of Grant's victories at Henry and Donelson. The Hartford, with Captain David G. Farragut on board as commander-in-chief of the fleet, arrived off the mouth of the river the twentieth day of February, and other vessels continued to arrive, until by the middle of April a formidable and adequate force had assembled. There were four of the big sloops of the Hartford class and one of the similar new sloops, the Oneida; the old Mississippi was there, and also the Iroquois and the Harriet Lane, of dates anterior to the war; there were ten of the ninety-day gunboats, one double-ender, and a number of armed merchant-steamers, besides a flotilla of twenty mortar-schooners, the latter under the immediate charge of Commander David D. Porter. Six of the steamers were attached to the mortar fleet to shift the schooners into position and to protect them from attacks that they could not resist with their peculiar ordnance. The fleet under Farragut's own command consisted when all preparations were complete of seventeen ships, all regularly built vessels of war except the Varuna, which was a fairly large armed merchant-steamer.

The first point to be attacked was a bend in the river some miles below New Orleans, where two formidable earthwork batteries called Jackson and St. Philip were located on opposite banks so advantageously that the upper one had a clear fire down the river past the other in the elbow of the bend. By this arrangement a ship or ships passing up and engaging the first fort broadside on would have the fire from the other full in the face. The river was further defended a short distance below the forts by a barrier of log rafts and schooners at anchor, supporting heavy chain cables extending from bank to bank clear across the river. Above the barrier and the forts was a Confederate flotilla of twelve vessels made up chiefly of river steamers and tugs, armed, and in some cases lightly armored with iron plates. This naval force was much inferior to Farragut's fleet of genuine war-vessels, but from its position was capable of inflicting damage and possible defeat upon the Federal ships should they come up straggling and injured from their encounter with the forts.

Porter's mortar-schooners were moved up the river to within about three thousand yards of the lower fort, Jackson, and almost perfectly hidden by dressing the masts with bushes and foliage, the vessels lying close to the bank with a background of forest. Beginning on April 18, they maintained an almost constant bombardment for about a week on Ft. Jackson, inflicting considerable damage

U. S. S. HARTFORD, 1858. (See page 29)

toward the objective up the river by not allowing the current to swing their bows down stream should they touch bottom, as would have occurred had they grounded when in the usual trim with the greatest draft of water at the stern. Yet another expedient was to daub the hulls of the ships with the yellowish clay of the river, making them the same color as the muddy water and therefore less distinctly visible as targets to shoot at. So many unusual steps were taken to ensure protection and success that Farragut thought it proper to refer to them in his report of the battle, which he did as follows: —

"Every vessel was as well prepared as the ingenuity of her commander and officers could suggest, both for the preservation of life and of the vessel, and, perhaps, there is not on record such a display of ingenuity as has been evinced in this little squadron. The first was by the engineer of the Richmond, Mr. Moore, by suggesting that the sheet cables be stopped up and down on the sides in the line of the engines, which was immediately adopted by all the vessels. Then each commander made his own arrangements for stopping the shot from penetrating the boilers or machinery that might come in forward or abaft, by hammocks, coal, bags of ashes, bags of sand, clothes-bags, and in fact, every device imaginable. The bulwarks were lined with hammocks by some, with splinter-nettings made of ropes by others. Some rubbed their vessels

over with mud, to make their ships less visible, and some whitewashed their decks, to make things more visible by night during the fight, all of which you will find mentioned in the reports of the commanders. In the afternoon I visited each ship, in order to know positively that each commander understood my orders for the attack, and to see that all was in readiness."

A gap was made in the chain barrier during the night of April 20, by Lieutenant Caldwell, in the gunboat Itasca; he gallantly boarded one of the schooners supporting the chain and cast adrift the ends of the chain that were fortunately found bitted on board. The fleet was formed in three divisions for the attack, and at two o'clock in the morning of the 24th the signal — two blood-red lights at the peak of the Hartford — was made for the movement to begin. There was a short delay in getting under way, occasioned by difficulty in managing the anchors in the swift current, but the first division soon moved up through the opening in the line of obstructions and became furiously engaged with the forts. This division consisted of eight vessels led by Captain Theodorus Bailey in the gunboat Cayuga, and had orders to keep close to the left, or east, bank of the river and give its principal attention to Fort St. Philip. The Pensacola and the Mississippi were the largest vessels in this division, the others being the Oneida, four ninety-day gunboats, and the converted steamer Varuna.

These ships steamed up into action, closely following behind each other in the formation then known as "line ahead," but now called "column."

Shortly after the first division had passed through the gap in the barrier, the second division, consisting only of the Hartford, the Brooklyn, and the Richmond, commanded by Farragut in person, moved up, and this was followed by the third division, led by Fleet Captain Bell in the gunboat Sciota. This last division was composed of five ninety-day gunboats and the sloop-of-war Iroquois, and was roughly received, coming up to the forts as it did after the distracting fire from the larger ships had passed on. Three of its gunboats — the Itasca, the Kennebec, and the Winona — were disabled or so injured that they failed to get past at all, dropping down stream out of action and rejoining the fleet some days later. When the fleet was moving up, the mortar-boats and steamers convoying them opened a heavy cannonade against the works of the enemy, adding their din and destruction to the already unearthly scene. The river, despite the obscurity of night and the dense masses of smoke that rolled over it, was lighted up with fire-rafts and burning wreckage in addition to the incessant flashes from the great number of guns and bursting shells, while the noise from the latter joined with the shouts of command and the screams of the wounded to increase the weirdness and terror of the hour. In his report

Farragut said: "Such a fire, I imagine, the world has rarely seen."

Within a little more than an hour after the first Federal vessel had passed through the obstructions the entire fleet, with the exception of the three gunboats that had been put out of action, had arrived above the forts and appeared among the ships of the enemy. The Cayuga and the Varuna arrived first and fared badly until other ships came up to their support. The Varuna was rammed twice and had to be run ashore to prevent her sinking in mid-stream, her loss being complete, as she sank on the river bank. The Cayuga had no less than forty-two hits, but she bravely kept on fighting and received individually the surrender of three of the Confederate vessels. In the enemy's squadron was an iron-plated ram named Manassas, obtained by rebuilding a large ocean tug, and this ugly craft rammed both the Richmond and the Mississippi at different stages of the combat. Fortunately both blows were glancing and not fatal though very damaging, and the Richmond owed her escape, according to her captain's report, to the chain mail that she wore. The Mississippi later in the fight attacked the Manassas and drove her ashore, where she was scuttled and abandoned by her crew. Later, as her stern settled with the weight of inflowing water, her bow floated clear of the bank, and she drifted down stream into Porter's flotilla, where

she caused considerable excitement before her harmless condition was discovered.

Eleven Confederate steamers were destroyed during this fierce morning fight, while the Varuna was the only vessel lost to Farragut. The total Federal casualties of the battle, as reported by the fleet surgeon, amounted to thirty-seven men killed and one hundred and forty-seven wounded, which makes this one of the most bloody naval engagements of the war. Two officers, both midshipmen, were killed, and eleven wounded. After a day spent at anchor to allow the crews the rest that was absolutely necessary after such a night, the ships proceeded up the river, silenced the Chalmette batteries without loss, and at noon of April 25 took possession of the city of New Orleans, which they held until May first, when General B. F. Butler arrived with troops and assumed military control. Farragut and his fleet then went on up the river to encounter and overcome other obstacles. Commander Porter with the mortar flotilla continued the bombardment of the lower forts until April 28, when they surrendered to him.

In its passage up the river the fleet met with no serious resistance until it arrived at Vicksburg, in Mississippi, where numerous batteries were located on the bluffs two or three hundred feet above and overlooking the river. To aid in the passage of this place, Porter's mortar-boats, sixteen in

number, were towed up from New Orleans, arriving before Vicksburg June 20. At four o'clock in the morning of June 28, the mortars opened fire on the enemy's batteries, which was at once returned, and the fleet got under way to attempt to run past. The ships then with Farragut were the Hartford (flagship), the Richmond, the Brooklyn, the Iroquois, the Oneida, and six of the ninety-day gunboats; these were formed in two lines, or double column, and steamed throughout the action at low speed in order to give full effect to their guns on the batteries above. Six steamers of Porter's flotilla also joined in the battle, which made the attacking force consist of seventeen steamers under way and the sixteen mortar-boats at anchor.

Farragut's ships were hit repeatedly and some were considerably injured, but all except the Brooklyn and two small gunboats that followed her movements got past the batteries and into the upper reach of the river beyond. The Brooklyn dropped down the river out of range after having been exposed to the enemy's fire for some time, and her example was followed by the ninety-day gunboats Kennebec and Katahdin. Farragut expressed his dissatisfaction at this conduct, and in his official report called attention to the fact that none of the delinquent vessels had any casualties. On board the other ships fifteen men were killed and thirty wounded, among the latter Farragut himself, who figured on the surgeon's report as having

suffered from contusions. The Oneida was again roughly used, having a number of casualties, and having her steam drum hit by an eight-inch solid shot that eventually came to rest in the fire-room. The most serious injury to any of the vessels was to the Clifton, one of Porter's steamers, which was completely disabled by having a boiler pierced by a solid shot, seven men being scalded to death, while another who jumped overboard to escape the steam was drowned.

There was nothing to be gained by attacking these batteries, located as they were so high that they could not be much damaged by gun fire from the river below, and could not be kept silent except when actually subject to a heavy fire. Farragut reported: "I passed up the river this morning, but to no purpose; the enemy leave their guns for the moment, but return to them as soon as we have passed, and rake us." The following extracts from his reports indicate that he had been ordered to try to run the batteries to see if it could be done, without having any object in view higher up the river.

"In obedience to the orders of the department and the command of the President, I proceeded back to Vicksburg with the Brooklyn, Richmond, and Hartford, with the determination to carry out my instructions to the best of my ability."

"The department will perceive from this (my) report that the forts can be *passed*, and *we have*

done it, and can *do it again as often as may be required of us*. It will not, however, be an easy matter for us to do more than silence the batteries for a time, as long as the enemy has a large force behind the hills to prevent our landing and holding the place."

Commander Porter's comment as to the impossibility of a naval force capturing the batteries as they were located is interesting: —

"All the steamers took good positions, and their commanders did their duty properly. It is to be regretted that a combined attack of army and navy had not been made, by which something more substantial might have been accomplished. Such an attack, I think, would have resulted in the capture of the city. Ships and mortar-vessels can keep full possession of the river, and places near the water's edge, but they cannot crawl up hills three hundred feet high, and it is that part of Vicksburg which must be taken by the army. If it was intended merely to pass the batteries at Vicksburg and make a junction with the fleet of Flag Officer Davis, the navy did it most gallantly and fearlessly. It was as handsome a thing as has been done during the war; for the batteries to be passed extended full three miles, with a three-knot current against ships that could not make eight knots under the most favorable circumstances."

In the same month (June, 1862) a disaster similar to that of the Clifton but much more serious

befell one of the ironclads of the Mississippi flotilla, still under the direction of the army. An expedition consisting of the Mound City and three other gunboats was sent up the White River in Arkansas to convoy troop-steamers and look for some armed vessels of the Confederates that were known to be in that river. At St. Charles it was found that the enemy had sunk his steamers in an attempt to block the river and had taken the guns from them to arm two batteries on shore. An Indiana regiment landed from the transports and captured the second battery by a gallant charge after the first had been silenced by the gunboats, but the victory was dearly paid for in the dreadful catastrophe that occurred on board the Mound City during the progress of the engagement.

A shot penetrated her casemate a little above and forward of the gun-port, killed three men in its flight, and exploded the steam drum, which was above water and dangerously exposed, as was the case in a majority of the vessels hastily improvised or modified for war uses. The casemate, in which the greater part of the crew was stationed at the guns, was instantly filled with steam, which scalded nearly eighty men to death outright and drove others overboard through the gun-ports, where many were drowned or shot while struggling in the water. Of a crew of one hundred and seventy-five officers and men, only twenty-five were unhurt, and the number who lost their lives,

including those who were drowned, and those who died subsequently of their injuries, was one hundred and thirty-five. Commander Kilty of the Mound City, who was in command of the flotilla, was so badly scalded that his left arm had to be amputated.

The Confederate commander of the steamers that had been sunk and of the batteries formed from their guns was Captain Joseph Fry, who had been a midshipman and lieutenant in the regular navy of the United States for a number of years before the war. He was wounded and taken prisoner, and while in the Federal hospital at Memphis narrowly escaped assassination at the hands of Union sailors who believed him guilty of having ordered his men to fire upon the unfortunates of the Mound City while they were helpless in the water. That many of them were shot while in the water was a matter of fact reported by officers who were present and admitted by the Confederates, who had fired grape and canister at the portholes of the St. Louis, near by and trying to rescue the struggling swimmers. Fry himself denied having given such an inhuman command, though he stated that he did order his riflemen to fire at some armed boats that he thought intended to land and cut off his retreat, but which in reality had been sent from the Union gunboats to pick up the men in the water. Whether Fry was personally accountable for the firing or not, his own

ending was equally tragic, and he was the victim of an even worse instance of ferocious barbarism. While in command of an American merchant-vessel, the Virginius, in 1873, he was captured by a Spanish gunboat near Jamaica, hastily and unfairly tried by court martial at Santiago de Cuba on charges of aiding a Cuban insurrection, and, with fifty-two of his crew and passengers, was summarily shot.

Farragut's ships repassed the Vicksburg batteries in the evening of the 15th of July, the movement being caused by the unexpected appearance of the Confederate ram Arkansas instead of by any particular object in wishing to get below Vicksburg. The Arkansas was an armored casemate ram with sloping sides not unlike the Merrimac, and was held in such awe by the general community that her destruction was very much desired. She was believed to be somewhere up the Yazoo River, at the union of which with the Mississippi Farragut's ships were lying. Accordingly, an expedition composed of light gunboats of the river flotilla was sent up to attack her, which expedition reappeared in haste the next morning to the surprise of every one, with the ram in hot pursuit; they had caught a Tartar. As Farragut had not imagined that the Arkansas would ever venture near a formidable fleet of genuine war-ships, the ships were without steam and unable to move, being therefore restricted to firing

into the ram and receiving her fire in return as she slowly passed close by them.

In spite of the furious cannonading she was subjected to, the Arkansas was not disabled, though considerably injured, and passed on until she gained the shelter of the Vicksburg batteries. Disappointed and mortified, Farragut ordered his ships to make ready to attack her, and late in the afternoon they got under way and proceeded towards Vicksburg for that purpose. Delays due to handling such large ships in a swift river so kept them back that it was dark by the time they arrived opposite the town. The Arkansas could not be seen, and her position could only be guessed by the flashes of guns, that of course were indistinguishable from the fire of riflemen and field batteries along the banks. The ships therefore did all the damage they could in the dark and dropped on down to an anchorage below Vicksburg. The exchange of shots in the morning and the more serious affair of the evening cost Farragut six men killed and sixteen wounded, three of the killed and six of the wounded being on his flagship, the Hartford. The ram was soon repaired, and she sustained her reputation as the terror of the river until August 6, when she was destroyed a few miles above Baton Rouge by the river ironclad Essex, Commander William D. Porter, assisted by two small wooden gunboats. Porter was a brother of the more famous David D. Porter,

and son of the Captain David Porter who had commanded the frigate Essex when she was captured by the Phœbe and Cherub during the second war with England. The Arkansas had come down to assist in an attack upon Baton Rouge, held by the Federals, and became disabled through the breaking down of her engines before arrival. Her people have always asserted that they set fire to her and abandoned her when they saw the approach of the Federal vessels, but Porter claimed that the fire was the result of shells from the Essex after considerable firing. At all events, she burned for a time and was then totally destroyed by the explosion of her magazine.

A famous battle in the Mississippi River occurred early in 1863, when Farragut attempted to pass Port Hudson, which place had been supplied with formidable batteries since the passage up and down the river of the ships the year before. Beside the Hartford, Farragut had the screw ships Richmond and Monongahela, the old side-wheel steamer Mississippi, and three small gunboats. In this attack the expedient was adopted of lashing a gunboat to each of the large ships on the side that would be away from the batteries and therefore unengaged; the object in this was to have motive power at hand to carry the heavy ships on past the batteries should their own machinery become disabled by the terrific fire that it was known they must sustain. The side wheels of the Mississippi

did not permit of this arrangement; and she had to go in without assistance, — to her doom, as the event proved.

About midnight of March 13–14 the ships moved up to the attack, and were at once brought under a heavy fire, being plainly seen by the light of bonfires and buildings burning on shore for that purpose. The Essex and some mortar-boats of Porter's fleet assisted in the battle, as they had done the year before at the forts below New Orleans, and at Vicksburg. Farragut in the Hartford, with the Albatross lashed alongside, ran the batteries successfully and gained the desired position in the river above, but all the others failed. The Monongahela grounded on a bar directly in front of the principal battery, and despite the utmost endeavors of her consort, the Kineo, and of her own engineers to work her off, she remained a stationary target for half an hour, and was badly cut up; six of her crew were killed, and twenty-one wounded. When eventually gotten afloat the engines were unfit for immediate use, as violent running backward with increased steam pressure to back the ship off had heated and cut the crank-pins. The Kineo was unable to carry her up against the strong current and she had to drop down the river and give up the attempt.

The Richmond, with the Genesee alongside, was disabled by a shot that carried away both safety-valves, letting the steam out of her boilers and

rendering her entirely helpless; the Genesee proved unable to stem the current with such a heavy load, and both ships had to drop down out of action. The Richmond had three men killed and twelve wounded, and the Genesee had three wounded.

The Mississippi, last in line, grounded in an unfortunate position where she was exposed to the cross-fire of three batteries, which she endured for thirty-five minutes before it was admitted that the efforts to get her afloat could not avail. Her engineers took the desperate risk of doubling the safe working pressure of the boilers, and the engines were backed with all their power, but without starting her, until finally, when the enemy had the range perfectly and many of her crew were killed or wounded, the order was given to set her on fire and abandon ship, which was done. Over two hundred of her people escaped to the west bank, where the enemy were in small numbers, and were subsequently rescued, with the exception of a few who straggled into the country and were taken prisoners. Altogether, she lost sixty-four men in killed and wounded.

After burning for a time and making a grand spectacle with her masts and spars all outlined in fire against the dark sky, she floated free from the bank and drifted down with the current toward the ships below, her guns discharging as they became overheated. These, fortunately, had been

trained at high elevation upon the batteries on the bluffs; so the shots went over the friendly ships, and were not the source of danger they might have been. After floating down past the other ships into the darkness below, a mass of fire from stem to stern, from waterline to truck, there was suddenly a tremendous explosion, the masts shot high in air like javelins hurled by a giant arm, an eruption of flame for a moment lit up the whole surrounding world, and amid the sullen thunder of her exploded magazine the Mississippi vanished from the earth in the river whose name she had borne so worthily and so long.

In the outset of his report of this engagement Farragut referred to it as a "disaster to my fleet," and said that he could only plead his zeal and the chances of war as reasons for the misfortune that had come upon him, adding that he had acted to the best of his judgment and was alone answerable for the imperfections of that judgment. From the official report of the captain of the Mississippi the comment, "I consider that I should be neglecting a most important duty should I omit to mention the coolness of my executive officer, Mr. Dewey," is of peculiar interest at this time when the same "Mr. Dewey" has become our great admiral and is more widely famous than any American naval officer since Farragut himself.

These events in the Mississippi River are only a few of the more important of a great series

that marked the industry of naval officers in that peculiar field of war. Though peculiar and not in accordance with preconceived notions of naval employment, the river region was wide in possibilities, and besides affording Farragut the foundation for his fame it established professional reputations for a number of other officers, less than his only in degree. Admiral David D. Porter, Commodore Foote, Rear Admirals George Brown, R. W. Meade, and John G. Walker, are a few only of the many distinguished names of the navy that first came into notice through deeds performed in uncouth steamers, utterly unlike the typical ship of war, in the midst of swamps and forests, instead of upon the open sea, where the naval officer is supposed to find his opportunity and his fame.

We will now leave the inland rivers and glance at some naval events that were taking place on the Atlantic coast. After the battle in Hampton Roads the public went "monitor mad," and under its insistence the Navy Department began the immediate construction of a numerous monitor fleet, as will be described in another chapter devoted to the spread of the monitor idea and the development of the battleship. Charleston, South Carolina, was one of the most important cities of the Confederacy, and in the early years of the war was its chief seaport; this was possible because of its excellent defenses — Fort Sumter in the harbor and various earthwork batteries at the harbor

ANDREW H. FOOTE DAVID D. PORTER

DAVID G. FARRAGUT

FRANKLIN BUCHANAN JOHN L. WORDEN

cient force to attack the fortifications was not collected until early in April, 1863.

Before this, some of the monitors had been put to some hostile service in the vicinity, principally to get the men accustomed to handling the turrets and guns in action. About the end of January the Montauk, commanded by Captain Worden of the original Monitor, made two attacks upon Fort McAllister in the Ogeechee River, in which she received nearly sixty hits without suffering any material damage and without having any of her people injured. On the 28th of February she again attacked the fort, accompanied by three gunboats and destroyed with her shells a Confederate privateer named Nashville, lying about twelve hundred yards up the river, where it had been for eight months waiting for an opportunity to escape to sea. In this action the Montauk was hit only five times and the gunboats not at all; a torpedo exploded under the Montauk when she was proceeding out of the river, and did her considerable injury, but not enough to disable her. On the 3d of March the Passaic, the Patapsco, and the Nahant attacked the same fort to test their gun mechanism, and came out uninjured except for dents in their turrets and side armor, after an engagement of eight hours. Many bolts in the gun-mounts broke under the strain of prolonged firing, and the discovery and repair of this weakness well repaid the risks run.

On the 7th of April the commander-in-chief of the fleet in those waters, Rear Admiral S. F. DuPont, made an unsuccessful attack upon the fortifications in Charleston harbor, using the iron-clads only. Beside his flagship, the New Ironsides, he had the monitors Catskill, Montauk, Nahant, Nantucket, Passaic, Patapsco, and Weehawken, and a nondescript ironclad, the Keokuk. The latter was one of the crop of inventions that sprang up after the successful performance of the Monitor, and was proved useless when put to the test of war. The New Ironsides, owing to her great draft and the difficulty of steering her in narrow places, did not approach the enemy's guns nearer than one thousand yards, but all the smaller iron-clads fought at about one half that distance. The New Ironsides fired but eight shots, each from a different gun, and the only important injury she sustained was the loss of one port-shutter, though she was hit sixty-five times. She was anchored for about an hour exactly over an observation mine containing two thousand pounds of gun-powder, while the operator, concealed on shore, was making frantic but futile efforts to explode it. The failure of this mine to explode has never been fully explained, but it saved the New Ironsides from what must have been complete destruction. It has been claimed that the wires leading to the mine were cut by Union sympathizers, but the difficulty of doing any such thing in an enemy's

country without detection renders this very improbable. The Confederate theory that the wires were cut by an ignorant teamster driving a heavy wagon through the sand in which they were buried is probably correct.

The monitors at close range were exposed to a furious fire from Sumter and Fort Moultrie, and from the batteries on Morris Island and Sullivan's Island, but in spite of the many hits they received none was actually disabled. The Keokuk fared differently: her armor was easily pierced by the enemy's projectiles, and after she had fired but three shots she had to withdraw from the battle to save herself from destruction. Within a space of thirty minutes she was hit ninety times and was pierced at or near the water line nineteen times, which caused her loss by sinking the next morning when the sea became rough enough to wash into the shot-holes. Fifteen of her crew were wounded, some seriously. On board the Nahant, a quartermaster was killed in the pilot-house by flying débris caused by the impact of shot outside, and Commander Downes and five others were injured in the pilot-house or turret from the same cause. These, and those mentioned as having occurred on the Keokuk, were the only Federal casualties of the day. The monitors were in action only about an hour, when by signal from the flagship they were withdrawn and anchored out of range of the forts, with the intention, as the admiral stated, of

renewing the attack in the morning. After seeing the captains, however, DuPont decided not to attack again, reporting that in his judgment "it would have converted a failure into a disaster." He also reported: —

"No ship had been exposed to the severest fire of the enemy over forty (40) minutes, and yet in that brief period, as the department will perceive by the detailed reports of the commanding officers, five of the iron-clads were wholly or partially disabled; disabled, too (as the obstructions could not be passed), in that which was most essential to our success, — I mean in their armament, or power of inflicting injury by their guns."

And again: —

"I had hoped that the endurance of the iron-clads would have enabled them to have so borne any weight of fire to which they might have been exposed; but when I found that so large a portion of them were wholly or one-half disabled, by less than an hour's engagement, before attempting to remove (overcome) the obstructions, or testing the power of the torpedoes, I was convinced that persistence in the attack would only result in the loss of the greater portion of the iron-clad fleet, and in leaving many of them inside the harbor, to fall into the hands of the enemy."

The actual injuries, as shown by the detailed reports of the commanding officers, failed to sustain this sweeping condemnation of the monitors.

Four of them, as stated in DuPont's own report, continued to use their guns throughout the action; the Patapsco lost the use of one of hers through the breaking of a part of the gun-carriage, due to firing the gun and not to the fire of the enemy; and the damage was not serious, as it was repaired within two hours. The Passaic had one gun disabled for several hours, by its slides being deformed by the impact of two heavy shots in quick succession on the outside of the turret. The Nantucket also had one gun put out of action by its port-shutter being jammed by several shots striking near the port and bending in the plates. On nearly all the monitors there was some trouble from the turrets getting jammed by bolt-heads being broken off inside by concussion and dropping into the crack between the deck-plate and the base of the turret, or by the base of the turret becoming distorted by the blows of shells against it. In later monitors this danger was provided against by a base ring or glacis plate being fitted around the base of the turret. Flying bolts and bolt-heads were a source of considerable danger, but the casualties from them were limited to those already mentioned.

Chief Engineer A. C. Stimers, whose important services in connection with the Monitor have already been described, had been the general inspector for the Navy Department of the building of all these monitors, and was more familiar with

their features than any other officer of the navy. Prior to the attack on the Charleston fortifications, he had been sent there with a large force of machinists and shipsmiths, to be on hand to repair any damages they might sustain in the intended attack, and was present at the time of the battle. He examined all the monitors the next day, and made a report very much at variance with Admiral DuPont's conclusions as to the injuries received and fitness for further service of the vessels, as appears from the following extracts: —

"I was, however, agreeably disappointed to find, upon my inspection of the monitor vessels the next morning, that there were no clear passages through the decks, and no penetrations through the sides of the vessels, or the pilot-houses. The blunt-headed shots had proven much less effective than round shot, not only in confining their injury to the indentation, made more distinctly than is the case with round shot, but the indentations themselves were less than those made by the spherical balls. On the other hand, I found casualties had occurred which occasioned loss of life in one instance, and disabled guns in others, through faults of design which only such experience could point out, and which, I think, can be entirely removed in the new vessels now building."

"In consideration of the vast importance to our country that that stronghold of rebellion should be reduced, I take the liberty to express to the

department my firm opinion that the obstructions can be readily passed with the means already provided, and our entire fleet of ironclads pass up successfully to the wharves of Charleston, and that the monitor vessels still retain sufficient enduring powers to enable them to pass all the forts and batteries which may reasonably be expected."

As Stimers, from his experience, was regarded as an authority in all that concerned monitors, his opinions in this instance had more weight with the Navy Department than the views of the admiral and captains, whose experience was short with that class of vessels, and who were suspected of professional prejudice against a form of vessel so novel, and so unlike the ships of war with which they had always been familiar. The Navy Department and the President were bitterly disappointed by the result of the attack on the Charleston forts and the failure to renew it, and began a correspondence with DuPont that excited his resentment, and resulted, a short time afterward, in his being detached from his command and deprived of further participation in the war. He undoubtedly was opposed to such radical changes in naval methods as the introduction of the monitors entailed, but the time was too serious for the cherishing of old naval traditions, and he had to go to the wall. Ericsson's biographer says of him, "There was no more accomplished officer in our naval service than Admiral DuPont, no man of

nobler personality; but he was the very incarnation of naval exclusiveness and prejudice against innovation, and the introduction of the monitors into our navy gave a shock to his sensibilities from which they never recovered. It may be that he was expected to accomplish with them more than was possible in his attack upon Charleston, but he was disposed to exaggerate their deficiencies and to criticise them in a spirit of unfriendliness that arrayed against him the active hostility of their champions."

Rear Admiral John A. Dahlgren succeeded to the command of the squadron early in July, and began, in conjunction with the army, a determined and prolonged struggle for possession of Charleston harbor. Fort Wagner, on Morris Island, was captured in September, but Sumter held out, though reduced to an almost shapeless mass of ruins by the end of the year. The monitors maintained themselves inside the bar, and the principal object in view — that of completely stopping the commerce of Charleston — was accomplished. They were engaged almost daily, for months, with the batteries, and proved their great value for harbor and coast service, to which sphere of operations they were limited in the projects of their designer. During all this time, but one serious casualty occurred on board a monitor. The Catskill, while engaged with Fort Wagner, was struck by a shot at the top of the pilot-house, which

broke the inner lining, and killed with flying débris Commander George W. Rodgers and Paymaster Woodbury, besides wounding two men who were in the pilot-house with them. These two officers, and the quartermaster who was killed on the Nahant, are the only persons who were killed on board the monitors by cannon fire during the whole course of the war.

Though the monitors did not engage the Charleston forts again while DuPont was in command, an event took place shortly before he was relieved that did much to restore public confidence in the monitor type. The Confederates in 1861 had purchased a large English blockade-runner named Fingal, an iron vessel, and had converted her into an armored ram on a plan similar to the one followed in the case of the Merrimac. For lack of iron armor or appliances for making it, they used an enormous quantity of wooden timbers for an armor belt along the water line, disposed as shown by the cross-section of the vessel. Thin iron plating was used on the *roof*, or sloping sides of the casemate. The battery consisted of four Brooke rifles, two of them pivoted for bow and stern as well as broadside fire, and a spar was fitted over the bow for carrying and operating a torpedo. The vessel, renamed Atlanta, was ready for sea in 1863 and crossed over by back channels from Savannah, where she had been rebuilt, into Wassaw Sound south of that city.

Learning of her presence there, DuPont sent the monitors Weehawken and Nahant, Captain John Rodgers of the former in command of the expedition, to intercept her. Early in the morning of June 17 the Atlanta came down to give battle, so confident that it is said she was accompanied by boats loaded with gay parties to witness her victory. The Nahant, having no pilot, had to follow in the wake of the Weehawken, and though close to her did not have an opportunity to fire a shot, so short and decisive was the conflict. At 4.55 A. M. the Atlanta began firing without effect, but the Weehawken withheld her fire for twenty minutes until in close range, when Rodgers began using his guns with deliberate precision. In fifteen minutes the Atlanta, aground and badly damaged, hauled down her flag and surrendered. Only five shots were fired by the Weehawken, one of which missed. The first one broke through the armor and wood backing on the casemate, strewed the gun-deck with splinters, and disabled about forty men; another struck the top of the pilot-house and stunned both pilots and the man at the wheel, which accounts for the vessel going aground. Captain Rodgers stated that "the first shot took away her desire to fight, and the second destroyed her ability to do so." The other two shots that struck did no serious damage. The Weehawken was not hit, nor was the Nahant. Prisoners stated that the Atlanta was the most formidable

vessel they had yet completed, and that they fully expected a victory over both the Weehawken and Nahant. The prize, which was found fully equipped for sea, was backed off into deep water with her own engines by the chief engineer of the Weehawken and steamed to Port Royal without escort, where she was refitted and became a vessel of the United States navy. She was appraised, with her ordnance and equipment, at a little more than $350,000.

After such a remarkable victory it is unfortunate to have to chronicle the loss of the Weehawken. About the middle of the afternoon of Sunday, December 6 of the same year, she sank suddenly while at anchor off Morris Island. The cause, as determined by a court of inquiry, was that her trim had been altered by putting a great quantity of ammunition into storerooms forward, where it did not belong, and leaving the forward hatch open when water was washing over the deck. Ordinarily all water that got below ran aft and was thrown out by the pumps in the engine-room, but with the trim changed so the vessel was "down by the head;" this did not occur until a great quantity of water had accumulated forward, bringing the bow down more and more and allowing greater quantities of water to get below. Desperate attempts were then made to relieve her, but it was too late; her limit of buoyancy, which was only 125 tons, was reached before the pumps began gaining on

the water, and though the greater part of her interior was still empty she went down. Four officers, all engineers, and twenty-six enlisted men perished in her, the whole watch on duty in the engine and fire rooms being lost.

The greatest injury done the United States by the Confederate navy during the war was that wrought upon her commerce. From the very beginning of the war commerce-destroying was resorted to by the South, and soon assumed such proportions that a considerable number of Federal vessels had to be diverted from regular naval enterprise and devoted to efforts for its suppression. At first small vessels, steamers, or even fast-sailing schooners, were commissioned as privateers, and, by reason of their size, confined themselves rather closely to the coast, where by issuing suddenly from some river or inlet they could fall upon unsuspecting passing coasters and seize them. Hatteras Inlet, until its capture by the Federals, was a favorite hiding-place, and the adjacent coast was the scene of a majority of these exploits. Prizes taken in this way, though considerable in numbers, were generally small coast-wise vessels of little or no use to the captors and of petty value. This peculiar industry ceased within a few months from lack of victims, as the coasting trade was suspended by the existence of war, and vessels going to or coming from more distant ports in the South began giving the coast a wide berth when the danger became known.

The over-sea commerce of the United States offered a wider and more profitable field for this species of enterprise, but a more difficult one because of lack of suitable vessels with which to exploit it. A few privateers, or sea-going war-vessels, were improvised from merchant-steamers, and two or three were built expressly for the purpose, but from first to last not more than eight or nine such vessels appeared upon the high seas. Small as was their number, however, the result of their depredations was to practically annihilate American commerce, and it has never yet been revived. Only two hundred and sixty-one vessels, all told and of all classes, were taken by the Confederate cruisers and privateers, which is an insignificant number compared with the total of American shipping at that time, but the example and danger led to the laying up or sale of great numbers of ships, and deterred neutrals from patronizing American ships as carriers.

The year before the war began, two thirds of the commerce of the port of New York was carried in American ships; three years later the portion was only one fourth. During the four years of the war over seven hundred American ships are recorded as having been transferred to the British flag alone, and many others went to other neutrals. "Privateering is and remains abolished" is a prominent clause in the Treaty of Paris, concluded by the principal nations of Europe at the close of

the Crimean war. An invitation was extended to the United States to subscribe to this part of the treaty, but we declined, probably because in former wars with a European power our privateers had been prominent instruments of injury to the enemy, and we expected to use them to equal advantage again. When the Civil War began and with it the destruction of our commerce, we expressed a willingness to subscribe to the Treaty of Paris, but it was too late; the offer was declined. Thus in a way did we fall into a pit of our own digging, and the resulting injury was great and seemingly is irreparable.

As this chapter is devoted to outlines of some of the chief naval events of the Civil War, it is proper that a sketch of the career of the most destructive of the Confederate cruisers be presented, though the deeds of a commerce-destroyer may not be particularly attractive. The results, as just mentioned, were certainly important and of more lasting influence than any of the naval battles of the war. The Alabama, or 290 as she was first called, because that was the number she was designated by while building in the yards of Messrs. Laird at Birkenhead, was constructed expressly for the Confederate government, and in open violation of the rules of war regarding the obligations of neutrals. Her principal dimensions and armament will be given later. She was a screw steamer with propeller arranged to discon-

nect and hoist clear of the water when sailing, and was bark-rigged with notably tall masts and wide spread of sail; so remarkable in fact in this respect that her peculiarity was known all over the world in a wonderfully short time, and American skippers in all seas soon came to recognize an unusually high mast on the sky-line as a harbinger of evil. Her speed under steam was about twelve knots, and under sail usually about ten; neither rate remarkable for that period, when speed had not become the all-important factor in ocean commerce, but rather better than the average sail or steam speed of the day.

Her intended career was sufficiently well known while she was building to cause the American Minister to Great Britain to call the attention of the authorities to her, and orders were sent to Liverpool to prevent her sailing without a satisfactory destination being given. Those were not the days of so-called "Anglo-Saxon" goodfellowship, and just at that time blood was not thicker than water; accordingly, the Alabama sailed away on an alleged trial trip without question and without any guard on board, and, according to expectation, never came back. The neglect of the local authorities was in the end expensive, as England had to pay, by judgment of the Geneva Tribunal, for all the damage done American shipping. Once clear of Liverpool docks the Alabama steamed around north of Ireland and then southerly direct to the

Azores, where a steamer with guns, ammunition, and the usual equipment of an armed cruiser, met her, and a few days later another steamer came with officers and crew. The captain was Raphael Semmes, who had been a commander in the navy of the United States before the war, and more recently had been in command of a Confederate cruiser named Sumter, engaged in preying upon American commerce. The officers with few exceptions were natives of the Southern States, and some of them had learned their profession in the navy of the United States before the war. The crew was made up of the rougher and more adventurous element of the human flotsam and jetsam that is abundant on the water streets of seaport cities in all countries, and was largely British, by which is meant English and Irish and Scotch; there were sea-rovers of other breeds, equally without country, and it is even said some were "Yankees." There were some trained gunners from the British navy, whose presence is admitted by English writers but not explained. Outside the territorial waters of the Azores (Portuguese), the guns, munitions of war, and crew were taken on board, the Confederate flag was hoisted, and the vessel proclaimed by Semmes the Alabama, in commission as a cruiser of the Confederate States of America. This was late in August, 1862.

Within three weeks the Alabama captured ten American whalers in the vicinity of the Azores,

that being a favorite whaling-ground at the time, and the American skippers were in complete ignorance that any vessels of the enemy were abroad. In every case the prize was burned as of no use to the captor, and the earnings of months or even years of the hardest toil and exposure by their crews were destroyed before their eyes. This wanton destruction of private property of course had not the slightest effect upon the government of the United States in its prosecution of the war, and was not war. Could the prizes have been sold for the benefit of the Confederacy, or made any use of, the case would have been different, though in any case warfare against unarmed and peaceful citizens is not a lofty employment. In October, Semmes ran across the Atlantic and intercepted no less than twelve outward-bound American ships in the vicinity of the Banks of Newfoundland, that being the time of year and the route for ships taking the season's wheat crop to European markets. Thence the Alabama proceeded southward to the West Indies, taking but one prize on the way, and put into Martinique for coal. At that port she was discovered and blockaded by the San Jacinto, but escaped to sea when she was ready without any apparent difficulty.

More coal was taken at a port in Venezuela, and then the Alabama appeared in the neighborhood of Hayti on the sea route of vessels going to and from Central and South America. There she

captured the Ariel of the Pacific Mail Steamship Company, the only steamer that was taken by her during her whole career. The Ariel was of better speed, but was lured into close range by supposing the stranger to be an American man-of-war; she had on board about five hundred passengers, mostly women and children, and a detachment of United States marines returning from the Pacific station. This great number of prisoners required the preservation of the prize for their conveyance; the marines were paroled as prisoners of war and the Ariel was released on a bond for $216,000 to be paid when the Confederate States should become an independent nation, a bond which has not yet become redeemable; the cash on board the Ariel, about $9000, was taken.

Semmes then proceeded into the Gulf of Mexico and appeared in sight of some Federal blockading ships off the port of Galveston about noon of January 11, 1863. Not imagining that the stranger could be anything worse than a blockade-runner, the weakest ship present was sent out to investigate. This was the Hatteras, a frail paddle-wheel steamer with overhead walking-beam, that had formerly been a river boat on the Delaware and was now lightly armed for war purposes, and wholly unfit for an encounter with a regularly built vessel of war. The Alabama made feint of running away until nearly dark, and when twenty miles or more away from the line of blockaders,

she allowed the Hatteras to approach; the commander of that vessel became suspicious when he found himself in the novel situation of gaining on a steamer with his feeble engines and boilers, but he was without support and there was nothing for it but to go on and investigate the stranger. Approaching within hail he asked the name of the ship, and was informed that it was "Her Britannic Majesty's ship Vixen." The Hatteras lowered a boat to board her, and as it shoved off, the two ships lying close together, the stranger announced, "This is the Confederate steamer Alabama," at the same time firing a broadside at point-blank range.

Knowing his inferiority in battery, Commander Blake of the Hatteras endeavored to close in and board, but the walking-beam of his engine was shot away and the steam cylinder also struck and broken immediately, either wound being sufficient to disable the ship entirely. Shells striking near the water line tore whole sheets of iron off the hull, and the vessel filled as rapidly as a perforated tin pan. In this fatal situation the Hatteras was obliged to surrender after an engagement of only fifteen minutes, and sank so soon afterward that the victors barely had time to rescue their prisoners. The casualties were remarkably few considering the character of the combat: the Hatteras had two men, both firemen, killed, and five wounded; one man only was wounded on the Ala-

bama. The crew of the boat that had been lowered from the Hatteras escaped and made its way back to Galveston. Some of the ships came out from the shore, attracted by the firing, but found nothing, as the Alabama was already far away with her prisoners, whom she carried to Kingston, in Jamaica, and put ashore in a pitiful condition without money or adequate clothing, as they had lost everything in the Hatteras. Notwithstanding their condition, their reception by the British residents of Kingston was such as to compel Commander Blake thus to refer to it in his official report: "Landed on an unfriendly shore, in a state of abject destitution, that should have commanded the sympathy of avowed enemies, we felt keenly the unkind criticisms of those who profess to have no dislike for our government or its people."

From Kingston, Semmes stood out into the Atlantic Ocean, as he knew that the West Indies would be dangerous cruising-ground for him after the affair of the Hatteras. Near the centre of the ocean, at the place known to sailors as the "cross-roads," because the trade-routes to and from South America and around the Cape of Good Hope from both Europe and North America meet there, he made five prizes. He then stood south along the route from South America, and took twenty-four American vessels within a short time, all of which, with but one exception, were

destroyed; the exception was the Conrad, which Semmes commissioned a Confederate cruiser under the name of Tuscaloosa, and sent forth on the same mission as himself. She made two prizes, but upon her arrival at Cape Town was held by the British authorities, who could not overlook the wholly irregular manner in which she was supposed to have acquired nationality.

After lingering for two months on the coast of Brazil, the Alabama crossed the South Atlantic to Cape Town, where some repairs were made, and whence she soon took her way across the Indian Ocean for the Straits of Sunda, where the sailing-routes to the Far East converge. There the hunting-ground was good, but after taking only two ships Semmes became alarmed at the rumored proximity of the United States sloop-of-war Wyoming, and moved on, going across the Bay of Bengal and northern Indian Ocean until he reached the east coast of Africa far north of Madagascar. Cruising on down the African coast without finding an American ship, though they had once been numerous there, the Alabama returned to Cape Town, thence across to Brazil, and then north by way of the cross-roads to Europe, arriving at Cherbourg, in France, June 11, 1864. She had been cruising now nearly two years, and in that time had made sixty-eight prizes, only two of which were taken on the return from the furthest point she had reached, as by that time the alarm had

gone forth, and the merchant shipping of the United States had been largely withdrawn from the seas. Of her sixty-eight prizes, fifty-three had been burned at sea by the captor. Compared with the great reaches of ocean she had traversed, the Alabama was now back practically to her starting-point, and it was destined that her cruising should end here.

The news of her arrival at Cherbourg traveled fast, and the next morning reached Captain Winslow of the United States sloop-of-war Kearsarge, lying at Flushing on an island off the coast of the Netherlands. Two days later the Kearsarge arrived off Cherbourg, but did not go inside the three-mile limit of territorial waters, to avoid the detention that the twenty-four-hours rule would have made her liable to. This, it may be explained, is an international agreement, obligatory upon neutrals, to prevent vessels that are hostile to each other from leaving the same port within twenty-four hours of each other. As belligerents may not remain in a neutral port longer than necessary to effect absolutely essential repairs or to take sufficient coal and provisions to carry them home, it would be possible, without the twenty-four-hour rule, for a powerful vessel to take advantage of the enforced departure of a weaker one by following her closely to sea and destroying her. So the Kearsarge lay off in free waters waiting for her enemy to come out. Semmes had nothing

to gain in fighting her, as his vocation was the destruction of merchantmen, in the successful pursuit of which he had gained a reputation that admitted no fear of rivalry. However, his feelings were very bitter toward the North and the service that he had formerly belonged to, and as he had great confidence in his ship and his crew, he sent a message to Winslow requesting him not to leave the vicinity, and assuring him that the Alabama would come out as soon as she could take coal and complete some repairs.

The two ships were as nearly equal in size and as evenly matched in armament and crews as could be wished for the principals in a sea duel, their chief features being as follows: —

	Kearsarge.	Alabama.
Length over all	214 ft. 3 in.	220 ft.
Length on water-line . . .	198 ft. 6 in.	210 ft.
Beam	33 ft. 10 in.	32 ft.
Depth of hold	16 ft.	17 ft.
Tonnage	1031	1150
Total crew on the day of battle	163	149

The Kearsarge carried two 11-inch smooth-bore shell-guns and one 30-pounder rifle pivoted to fire on either broadside, and four 32-pounders, two on each broadside; she could therefore fight five guns on either side, and she did so in the engagement, her starboard battery only being engaged. The battery of the Alabama consisted of one 7-inch Blakely rifle, one 8-inch shell-gun,

six 32-pounders, and one 9-pounder, so mounted that she could fight seven guns in broadside, which she did. Though using five guns to the Alabama's seven, the Kearsarge could throw the greater weight of metal at a broadside, or exactly 366 pounds to the Alabama's 305. These figures seem almost ridiculous to-day, when there are large numbers of guns afloat on the battleships of the United States navy that throw single projectiles weighing three or four times as much as one of these broadsides.

Though the two ships were so nearly alike on paper, there was one great difference between them in favor of the Kearsarge, and that was in the morale and character of their crews. That of the Alabama, as has been noted, was made up of adventurers from many lands, without interest in the flag under which they served, except for the destructive career it afforded them, and probably without knowledge of the reasons for its existence. Very few of them had ever set foot in the Confederacy, and they cared as little for its defense as they knew of its history. With but eleven exceptions, the crew of the Kearsarge was composed of native-born citizens of the United States, the most of them being seamen and mechanics from the coast and machine-shops of New England. They had been organized as a fighting unit under the perfecting influence of constant drills and systematized discipline on board the Kearsarge for more

than two years, and they were animated by devotion to a great cause that they understood, and were ready to fight for, or if need be to die for. The event furnished one more instance of the many that are prominent in naval affairs through all the ages to support the trite maxim that men rather than ships win battles.

On Sunday morning, June 19, 1864, five days after the Kearsarge had appeared off Cherbourg, the Alabama came out to give her battle. The Kearsarge at first steamed further out to sea to make sure that the fight should not work its way into neutral waters and be interfered with by the French naval force present. When about seven miles off shore she turned and headed for her adversary, the Alabama beginning the fight by firing an ineffectual broadside when the ships were a mile distant from each other. The Kearsarge did not reply until the distance had decreased to about nine hundred yards, when she began firing shell slowly and with careful aim. The firing of the Alabama at all times was rapid and wild, showing lack of drill.

The Kearsarge endeavored to steam between the Alabama and the shore to prevent the fight from taking place on parallel lines leading toward the three-mile limit, and the Alabama, to prevent being raked by the change in position that this involved, kept sheering so that her broadside was always presented to her foe. Thus it came about

ACTION BETWEEN THE KEARSARGE AND THE ALABAMA

fired only one hundred and seventy-three shots and must have made a good proportion of hits, as the Alabama sank, carrying the proof of her enemy's marksmanship with her. From survivors it was learned that the Federal fire had been very destructive, disabling many men, blocking the engines with coal and wreckage from the explosion of a shell in a coal-bunker, and making so many holes near the water line that it was impossible to keep the ship afloat. An hour after the engagement began, the Alabama set her head sails and endeavored to reach the three-mile limit with their aid, but as the water was reaching and extinguishing her furnace fires she was practically helpless, and the effort was futile. The Kearsarge steamed across her bow into a raking position, where a few shots brought down her flag and led to the substitution of a white one in token of surrender. Two minutes later the Kearsarge fired into her a few times more because she had resumed firing. Twenty minutes after the surrender the Alabama sank by the stern, her bow rising high in air as she went down.

The wounded had been put out of the ship in a boat before she sank, and the others now took to the water, where the greater part of them were rescued by the British yacht Deerhound, a French pilot-boat, and two boats sent from the Kearsarge. Semmes himself was picked up by the Deerhound, and with forty or more of his crew was landed in

England, where they were received with great enthusiasm and marked approbation. Owing to desertions and changes in the crew while in Cherbourg and the dispersion after the fight, the fate of the Alabama's men has never been exactly known, but as reported by the English newspapers immediately after the fight was as follows: —

Killed	11
Drowned	3
Wounded	25
Taken by the Kearsarge	54
Picked up by French pilot-boat	10
Taken to England by the Deerhound	41 to 47

After his defeat Captain Semmes spoke bitterly of the conduct of his enemy in several regards: for firing into him after the surrender, claiming that he had not fired after displaying the white flag; for tardiness in sending boats to the rescue of the men in the water, and especially for the "Yankee trick" of protecting the machinery of the Kearsarge by stopping the chain cables on the sides of the ship just as had been done by Farragut two years before. The conduct of the Deerhound was much criticised for taking the men of the Alabama to a friendly port where they escaped being prisoners of war, but she was asked by Captain Winslow to aid in the rescue and did not violate any rule of neutrality by carrying the survivors to a place of safety. Bitter as were the reproaches

aimed by Semmes at his victorious foe, they were more than matched by the opinions of himself expressed by the Federal Secretary of the Navy, which as a fine example of official invective is worth repeating: —

NAVY DEPARTMENT, July 12, 1864.

SIR: — Your despatch of the 21st ultimo (No. 21) is received, stating your efforts to save the lives of the survivors of the Alabama, after the battle of the 19th of June, and after the formal surrender and destruction of that vessel. Your efforts in the cause of humanity in striving to rescue these men, most of them aliens, who have, under their ignoble leader — himself a deserter from our service and a traitor to our flag — been for two years making piratical war on unarmed merchantmen, are rightly appreciated.

It is to be regretted that the confidence and generous sympathy which you exercised, and which would actuate all honorable minds under similar circumstances, should have been so requited and abused by the persons on board the Deerhound, an English vessel of the royal yacht squadron.

That the wretched commander of the sunken corsair should have resorted to any dishonorable means to escape after his surrender; that he should have thrown overboard the sword that was no longer his; that before encountering an armed antagonist the mercenary rover should have removed

the chronometers, and other plunder stolen from peaceful commerce, are not matters of surprise, for each act is characteristic of one who has been false to his country and flag. You could not have expected, however, that gentlemen, or those claiming to be gentlemen, would, on such an occasion, act in bad faith, and that having been called upon or permitted to assist in rescuing persons or property which had been surrendered to you, would run away with either. It is now evident that your confidence in the Deerhound, and the persons connected with her, was misplaced.

The department commends your efforts to save the lives of drowning men, although they had been engaged in robbing and destroying the property of those who had never injured them. In paroling the prisoners, however, you committed a grave error.

The Alabama was an English-built vessel, armed and manned by Englishmen; has never had any other than an English register; has never sailed under any recognized national flag since she left the shores of England; has never visited any port in North America, and her career of devastation, since she went forth from England, is one that does not entitle those of her crew who were captured to be paroled. This department expressly disavows that act. Extreme caution must be exercised so that we in no way change the character of this English-built and English-manned, if not

English-owned vessel, or relieve those who may be implicated in sending forth this robber upon the seas from any responsibility to which they may be liable for the outrages she has committed.

Very respectfully, your obedient servant,

GIDEON WELLES,
Secretary of the Navy.

Captain JOHN A. WINSLOW, U. S. N.,
Com'dg United States Steamer Kearsarge, Cherbourg, France.

The most sanguinary and important naval battle of the Civil War was the famous engagement in Mobile Bay on the morning of August 5, 1864. The situation here was similar to that at the forts below New Orleans in that the ships had to pass through a narrow channel by a formidable fort on shore, and was even more difficult by reason of the presence of a powerful ironclad, the Tennessee, above the fort, and an obstructing line of torpedoes in front of it across the channel. Admiral Farragut was still in command of the fleet, and still flew his flag from the already famous Hartford. The fleet present consisted of a number of the large sloops-of-war, several gunboats of different classes, and four monitors; the latter had been sent at Farragut's urgent request to give him proper vessels with which to assail the forts and the Tennessee. Two of them, the Chickasaw and Winnebago, were double-turreted "turtle-backed" craft of the Eads type from the Mississippi River, and the others, the Tecumseh and Manhattan, were single-turreted Ericsson monitors.

In the order of battle it was directed that the monitors should lead the column of wooden ships and receive the first attack from the fort, as they would not suffer from it as much as the others, and could begin to get it in check with their gun fire. Superfluous boats, spars, etc., were taken out of the ships and anchored off shore or left at Pensacola, some of the big ships even dispensing with their lower yards and topmasts. The expedient adopted without success at Port Hudson, of lashing a small vessel to the unengaged side of a large one, was again resorted to, the object being the same, to have power present to carry the large ships out of the fire of the fort should their machinery become disabled. There were seven pairs thus made, as follows, the name of the larger or fighting ship first in each pair, and the pairs given in the order in which they went into the fight: Brooklyn and Octorara; Hartford and Metacomet; Richmond and Port Royal; Lackawanna and Seminole; Monongahela and Kennebec; Ossipee and Itasca; Oneida and Galena. The monitors, in the order Tecumseh, Manhattan, Winnebago, and Chickasaw, formed a line ahead by themselves on the starboard bow of the leading ships and closer in to the land.

All preparations having been made the day and night before, the crews had breakfast at an early hour, and at 5.30 A. M., August 5, the signal was made to get under way, the pairs of ships, already lashed together, advancing with low steam toward

the scene of battle. Farragut chose a position for observation in the port main rigging of the Hartford, and as the smoke interfered with his vision, he mounted higher and higher up the ratlines until he arrived at the futtock shrouds just below the main-top. Captain Drayton, fearing that his chief might lose his footing by some shock to the mast, sent the signal quartermaster, Knowles, up the rigging to make his position more secure. When the incident became magnified and its details, as always happens in such cases, became a matter of dispute, Knowles was called upon for his story of exactly what was done. He said: "I went up with a piece of lead-line and made it fast to one of the forward shrouds, and then took it round the admiral to the after shroud, making it fast there. The admiral said, 'Never mind, I am all right;' but I went ahead and obeyed orders, for I feared he would fall overboard if anything should carry away or he should be struck." This appears to be the whole sum and substance of the story of Farragut being "lashed" to the rigging. He remained in the position described until the ships had passed above the forts.

By 6.30 A. M. the line was well up toward the fort, and about 6.45 the Tecumseh fired each of her two guns once at the fort; she then loaded with steel bolts and the heaviest charges of powder allowed, to be in readiness for the Tennessee, and consequently did not participate in the firing

that soon began. A few minutes after seven (the reports varying somewhat), the fort opened on the leading ships, and its fire was at once returned by the " bow chasers " of the Brooklyn. These were two 100-pounder Parrott guns mounted on her forecastle, and it was due to her having them and an ingenious device for picking up torpedoes that Farragut had been influenced against his wish to let her take the lead instead of the Hartford. The action soon became general, and then furious, as the fleet drew nearer to the fort. Fort Morgan contained thirty-five large guns, fourteen of which were rifles, and there was in addition an exterior earthwork, called the Water Battery, which mounted twenty-nine others, four of which were 10-inch shell-guns. The Tennessee and three gunboats had drawn out from behind the fort ahead and were adding their fire, directly in front of the advancing ships.

By half past seven several of the ships were abreast of the fort, and by their tremendous fire, made more deadly by the use of grape, had almost silenced the enemy's guns. At this juncture the Tecumseh, then about three hundred yards ahead and on the starboard bow of the Brooklyn, was observed to lurch suddenly and then go down almost instantly. She had run upon a torpedo, the explosion of which communicated a severe shock through the water to the adjacent ships and, from the suddenness with which she sank, probably tore

the bottom out of the Tecumseh. Her bow was seen to settle in the water, the stern rose in air with the screw racing violently, and before the startled onlookers could fully realize what had happened she literally dived out of sight. Of a crew of 112 officers and men, only three officers and seventeen men were saved, the most of these having escaped through the gun-ports in the turret, and been picked up by a boat sent from the Metacomet. With the exception of one coal-heaver, the entire engine-room force of six officers and thirty-seven men perished. In the moment of the Tecumseh's destruction occurred a simple act of sublime heroism that is often told, but cannot be too often repeated. Her commander, Tunis A. Craven, and the pilot met at the little hatchway in the floor of the pilot-house that opened into the turret, and through which but one man could pass at a time. Craven stepped aside, saying, "After you, pilot," and the pilot saved his life by gaining the turret and plunging out of a gun-port as the vessel dropped under water; but Craven went down with his ship. Short and simple tragedies like this have elevated the profession of arms in all ages by ennobling the heroes who have been their victims.

The orders to the Tecumseh were to pass inside a red buoy that was known to mark the termination of the row of torpedoes, but instead of so doing she passed outside it and ran upon a torpedo

as described. Farragut held himself somewhat to blame, as he believed the catastrophe would have been averted had he instead of yielding to his captains insisted upon leading the line in the Hartford. Some notes of the battle written by him contain the following: "Allowing the Brooklyn to go ahead was a great error. It lost not only the Tecumseh, but many valuable lives, by keeping us under the fire of the forts for thirty minutes; whereas, had I led, as I intended to do, I would have gone inside the buoys, and all would have followed me."

Some confusion at the head of the line had already occurred because of the Brooklyn faltering, backing her engines, and drifting down across the channel close upon the Hartford. It is said she mistook a line of empty shell-boxes floating down from the Confederate vessels above for buoys marking torpedoes, and it is certain that she signaled "torpedoes" when asked by the flagship what the matter was. Then the resolution and commanding genius of Farragut's character came to the front, as, undaunted, he shouted above the uproar of battle the famous order, "Damn the torpedoes! Go ahead!" at the same time ordering full speed for his own ship. The Hartford steamed rapidly past the Brooklyn and took her place at the head of the column, the other ships closely following their commander-in-chief, who without further delay led them into Mobile Bay.

The fire of the larger ships kept that of the fort in check while they were passing, but the last in line, the evil-starred Oneida, fared badly, as the men in the fort had returned to their guns by the time she came up. It was probably a mistake to put a small ship at the end of the line, as she could not protect herself with her battery so effectually as the larger ships could and did. She, like the others, had the improvised chain armor hanging on the exposed (starboard) side, but this was pierced by a rifled shell that entered and exploded one of her boilers, killing outright or severely scalding all the firemen and coalheavers of the watch below. The motive power of the ship was disabled by this accident; but in a short time the exploded boiler was cut off from the other, and, assisted by the Galena, she passed on, her gun fire not having been interrupted by this disaster nor by others caused by shells cutting the wheel-ropes and starting a fire near the forward magazine.

When the leading ships got past the fort they were attacked by the Tennessee, which made a futile effort to ram the Hartford, and then exchanged shots with most of the other vessels as they came up and passed her. The most damage done at this stage of the fight was to the luckless Oneida, coming up partially disabled just in time to receive a raking broadside from the Tennessee that destroyed boats and rigging, dismounted a

gun, crippled the mainmast, and wounded several of her people, among them Commander Mullany, who lost an arm. The fire from the Confederate gunboats in front of the ships had been so annoying that Farragut, as soon as he was past the fort, ordered some of his small gunboats to cast off from their consorts and attack them. The Metacomet, leaving the Hartford, pursued and captured one of them, the Selma, and the two others — Morgan and Gaines — were chased ashore near the fort, where the Gaines was burned, the Morgan eventually escaping to Mobile.

The ships proceeded about four miles up the bay and anchored to clear away the wreckage on their decks, but very soon the Tennessee was seen following them, alone and bent on having another fight. She made a desperate stand against the whole Federal fleet, and fought them for an hour before she was literally worried into a surrender. Her low speed prevented the use of her most dangerous weapon — the ram — against much faster vessels, and made her the subject for successful attack in the same way by vessels not fitted for ramming. Her greatest injuries came from the heavy projectiles of the three remaining monitors that hung close upon her like bull-dogs around a bear. Of the ramming efforts Farragut wrote in his report, "In this engagement the Tennessee ran at our entire line of fourteen vessels, and yet never succeeded in striking one, but, on the con-

trary, she was herself struck in succession by the Monongahela, the Lackawanna, the Hartford, and the Ossipee. All the injuries she inflicted were with her guns. As a ram she did us no harm whatever."

The casualties of the Federal ships in this historic morning battle were considerable, and were greater than in any other naval engagement of the Civil War. Tabulated by ships they were as follows: —

	Killed.	Wounded.
Hartford	25	28
Brooklyn	11	43
Lackawanna	4	35
Oneida	8	30
Monongahela	0	6
Metacomet	1	2
Ossipee	1	7
Richmond	0	2
Galena	0	1
Octorara	1	10
Kennebec	1	6
Tecumseh	92	0
Totals	144	170

On the Tennessee, the Confederate admiral, Franklin Buchanan, lost a leg; two men were killed and eight wounded. The Selma in her fight with the Metacomet had eight men killed and seven wounded. The survivors of the crews of the Tennessee and the Selma became prisoners

of war. About three weeks after the battle, Fort Morgan surrendered to the combined army and naval forces, the other fortifications in Mobile Bay having surrendered or been abandoned within a day or two after the battle.

CHAPTER IV

EVOLUTION OF THE BATTLESHIP

We now come to the consideration of the much-discussed "revolution in naval architecture" that is popularly supposed to have been the result of the example of the Monitor. In this, as in much that has gone before, it is necessary to be cautious before ascribing great results to individual causes. The steam engine and the art of steam navigation were not sudden discoveries, but, as has been shown, were slow growths and the productions of many minds. This also is true of the changed methods of war-ship construction, which were in progress before the day of the Monitor, and would have continued to advance without her example, though much hastened by it. Without the Merrimac and Monitor the evolution that began in the Stevens battery, the Kinburn batteries, the Warrior, and La Gloire, would have progressed slowly and, unless quickened by the emergency constructions of some other war, might not have resulted in the modern battleship before the middle of the twentieth century; but there can be no doubt that that creation would have been reached eventually.

No principle brought into prominence by the conflict in Hampton Roads was novel; the ram was as old as Salamis; armor protection for ships of war was used by the vikings, who hung their tough shields over the sides of their ships; the revolving tower as a protection for men and missile-throwing machines was in action first in modern times on board the Monitor, but it was not a new thing. Ericsson himself, in the progress of a controversy as to the so-called invention, admitted that "a house or turret, turning on a pivot for protecting apparatus intended to throw war-like projectiles, is an ancient device; I believe was known among the Greeks. Thinking back, I cannot fix any period in my life at which I did not know of its existence." He stoutly maintained, however, that the Timby revolving turret, described in a former chapter, and antedating the Monitor by several years, was a totally different invention. The capitalists who became his associates in building monitors looked at this question differently, and found it a practical business precaution to buy the right to use Timby's patent and thus avoid litigation.

The sinking of the Cumberland by the Merrimac revived belief in the ram as a weapon to such an extent that very few vessels of war have been built since that day that have not been provided with an under-water projecting or ram bow. Faith in the ram was further augmented by the battle of

Lissa in 1866, in which the Austrian Ferdinand Maximilian rammed and sank the Italian flagship Re d' Italia. The United States must be excepted from the general statement that the ram was adopted by all nations as a result of the Merrimac's exploit. Throughout the course of the Civil War and for about ten years thereafter all vessels, except a few of special types, built for the United States navy retained the graceful overhanging bow that was characteristic of the American clipper-ship, with long head booms and towering masts. This reluctance on the part of American naval officers and architects to give up an established form that had outlived its purposes is the more remarkable because it was our country that first suffered from the revival of the ram, and because at that very time American shipbuilders were constructing for the Italian government war-vessels that were conspicuous for the prominence of their ram bows.

The battle of the ironclads proved beyond dispute the value of armor, but the question as to the manner of placing that armor remained open. The English and French naturally adhered at first to their practice of plating large broadside ships, but the influence of the turret soon had an effect and led to many curious modifications in the arrangement of armor. The modern system of protecting guns in revolving turrets or behind circular barbettes is the result of the evolution, and is the greatest change that may be attributed to the

event in Hampton Roads. In the United States, the change was immediate, without a long experimental period. The complete novelty of the Monitor's construction and the magnitude of her achievement so charmed the public mind that the shipbuilding policy of the government was controlled, and many vessels of the monitor type were at once built. Operations in rivers early in the war had shown the necessity of metal armor for gunboats, and in December, 1861, three months before the Monitor was completed, the Secretary of the Navy had asked Congress for authority to build twenty ironclad steamers, but it was not until the February following that a law granting that authority was enacted. This law simply appropriated ten million dollars for armored vessels, without specifying the number or type. Many designs were proposed to the Navy Department, but nothing definite was decided upon, as it was thought proper to wait until Ericsson's then nearly completed battery had been tested at sea and in battle.

The meeting in Hampton Roads fixed the monitor type upon the United States navy, and just one week later, March 16, 1862, an order was given to Ericsson to build with all possible speed six vessels on the general plans of the Monitor. Three of these were built at the Continental Iron Works, where the Monitor had been built, and the others by other shipbuilding establishments. Ericsson, encouraged by his happy selection of the name

for the Monitor, bestowed upon the new vessels the names Impenetrable, Penetrator, Paradox, Gauntlet, Palladium, and Agitator, but the Navy Department gave them good American names that were much shorter — Passaic, Montauk, Catskill, Patapsco, Lehigh, and Sangamon. They were in general dimensions about one third larger than the Monitor and possessed certain improvements that had been found desirable: chief among these were a permanent smokepipe, the pilot-house placed on top of the turret, and provision for getting air into the fire-room by means of large standing ventilators. The contract price was $400,000 each. Each was armed with two 15-inch cast-iron guns. All were completed by the end of the year and became prominent in naval operations, especially in the investment of Charleston harbor. One, the Patapsco, was sunk by a torpedo off Charleston in January, 1865, but the others still remain on the list of ships of our navy, and were prepared for coast-defense duty in the recent war with Spain.

Besides these six, contracts were made about the same time with various shipbuilders for four other monitors of the same class, Ericsson's designs being followed. These were the Camanche, the Nahant, the Nantucket, and the Weehawken, — all yet on the navy list except the Weehawken, which after distinguishing herself by defeating and capturing the Atlanta, a Confederate armorclad of the same type as the Merrimac, was herself lost, in

December, 1863, by foundering in the harbor of Charleston, four assistant engineers and twenty-six enlisted men perishing in her. In July, 1862, while Ericsson was busy rushing forward the work on the Passaic class, he undertook contracts to build two huge monitors, — Dictator and Puritan, — each of nearly five times the displacement of the original Monitor and costing in round numbers four times as much each. They would have been the most formidable ships in the world at that time if completed as soon as expected, but the work was much delayed by changes suggested by naval officers and by the resulting controversies with Ericsson, who was unwilling to receive advice from any source on a subject that he fancied himself master of. In the end neither vessel was completed in time to be of any service during the Civil War, and the Puritan as first projected was never completed: long after the close of the war a new and improved Puritan was built from the old one, but little except the name entered into the new construction.

The same year (1862) the government undertook the construction of four large double-turreted monitors at navy-yards as follows; Miantonomoh, at New York; Tonawanda (afterward named Amphitrite), at Philadelphia; Monadnock, at Boston, and Agamenticus (Terror), at Boston. The hulls of these vessels were of wood and deteriorated after a few years to such an extent as to make the

ships worthless, but not before two of them had performed the very important service of proving that the monitor type was capable of long sea voyages. The year after the war ended, the Monadnock steamed successfully from Philadelphia to San Francisco around the continent of South America, and the Miantonomoh astonished European critics by crossing the Atlantic and appearing at various dockyards in England and elsewhere. Beginning in 1874 and extending over a period of twenty years, a system of "repairing" was applied to these four monitors that resulted in entirely new iron vessels, with modern rifled guns, approved turret-turning mechanism, and modern armor. They were all actively employed in the late war with Spain and did useful service, though taken far from their proper station as harbor-defense ships. Because of slowness, and lack of comfort in their living spaces in hot climates under steam, their record in the Spanish war was injurious rather than otherwise to the reputation of the monitor type.

The placing of two turrets on one hull was opposed by Ericsson as a departure from his original conception of mounting guns in such manner that they could be turned to fire in any direction, which object was defeated in the case of double turrets, as each masked a considerable angle of fire of the other. The prevailing naval notion, fixed by some centuries of practice, was, that heavy broadside fire was of the utmost importance, and it was in

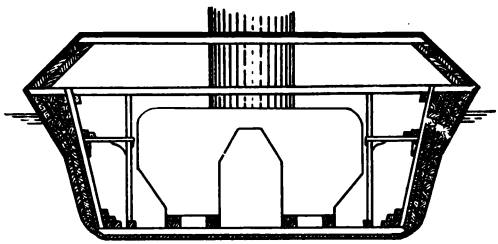
accordance with that belief that two turrets were adopted. In one instance three turrets were placed on the same ship, the frigate Roanoke being cut down somewhat as the Merrimac had been and three Ericsson turrets installed on her deck; she was not a success. Besides the four double-turreted monitors begun in 1862 in navy-yards, another large one, the Onondaga, was undertaken by contract in New York, and four others at places in the Mississippi Valley. The Onondaga, after over a year of active war service, was returned to her builder at his request, and by him sold to the French government.

The Western river monitors were considerably different from Ericsson's design, the guns being mounted in turrets on a "disappearing" principle invented by the distinguished engineer James B. Eads, and the decks were so crowned or rounded that the vessels were known as "turtle-backs." Another peculiar feature was that they each had four propelling screws, two on each side of the rudder, each pair driven by bevel gearing from the same engine shaft. Five small single-turreted monitors of special types were placed under construction in the Mississippi Valley at the same time as the larger ones. In September of the same year nine Ericsson monitors, similar to but slightly larger than the Passaic class, were undertaken by contract; they are known from one of them as the Canonicus class, though the most famous was

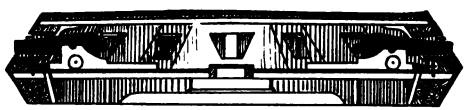
the Tecumseh, which was sunk by a torpedo in the battle of Mobile Bay. From the foregoing we see that the monitor idea was in such favor that within a few months after the Monitor-Merrimac duel no less than thirty-five vessels of that type were being built for the United States navy.

In addition to monitors, the year 1862 produced in the United States a number of other armor-clads of special types, mostly small, and not marked by much success in their brief careers. One, however, the Dunderberg, was very large, and such an important advance in war-ship construction that a description of her is necessary. Described as an "ocean-going, ironclad frigate ram," this ship, instead of following the revolving turret example of the Monitor, was a reproduction, in greatly improved form, of the casemate broadside system of the Merrimac. That is, she consisted essentially of a low hull, with prominent ram, surmounted by an armored casemate with sloping sides, in which was mounted a very heavy battery.

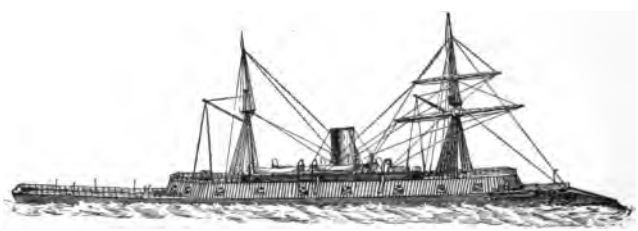
As shown by the midship section of this ship, wood was used for armor at the knuckle about the water-line in very much the same arrangement employed by the Confederates in their constructions; with the latter, however, the employment of wood was a necessity because of lack of iron armor and the appliances for making it. The sides of the Dunderberg were sloped at an angle of thirty-five degrees from the perpendicular below the knuckle



Midship Section



Section through Battery



U. S. S. DUNDERBERG, 1862

Extreme length	380 feet,	4 inches.
Extreme beam	72 "	10 "
Draft when equipped for sea .	21 "	
Length of ram	50 "	
Displacement		7000 tons.
Tonnage		5090 "
Weight of iron armor		1000 "
Capacity of coal-bunkers		1000 "
Horse-power of main engines . . .		5000.

The public had become so imbued with the monitor idea after the event in Hampton Roads that the shipbuilding policy of the government was dictated by it, and the principal constructions of that year were the large number of monitors before mentioned. The next year (1863), monitors still predominated, though a large number of wooden frigates and sloops-of-war were placed under construction to provide a fleet for general cruising purposes. The principal monitors projected that year were four, with double turrets, undertaken at navy-yards. They were big ships (5600 tons displacement) with big names, — Quinsigamond, Passaconaway, Kalamazoo, and Shackamaxon, — intended to be heavily armed and armored and fit for ocean cruising; battleships, in fact. The end of the war found them still on the stocks, and under the policy of retrenchment that followed, not one of them was ever completed. More unfortunate was the experience begun that year with a class of light-draft single-turreted

monitors that would have been very useful for service in rivers and on shallow coasts. No less than twenty such vessels were begun by contract early in the year, but because of changes in weights imposed upon the builders, and errors in the original designs, the first to be launched would barely float, and only a few of them were ever fully completed; none gave any valuable service to the navy, and all were soon broken up and sold for old iron for a tithe of their original cost.

No monitors, and but few ships of any kind, appeared in the shipbuilding programme of 1864, after which year the United States practically dropped out of sight for twenty years as a naval or maritime power. The wait was a long one, and particularly humiliating to naval officers, who had to witness the slow decay of our fleet, until the few ships that remained to display the flag abroad were inferior in every respect to the war-vessels of even the fourth-rate powers of South America and the Orient. During our long period of naval repose, the principal nations of Europe were spending fortunes in a rivalry to excel in the development of ships, armor, and guns. As a consequence, the naval indifference of the United States was not without recompense, for when we again awoke to our naval necessities we were able to profit by the experience of other nations and proceed with the construction of a modern fleet without the preliminary expense of learning by experiment what

to build. By timidity and good luck combined we were not involved in a war during the twenty years of inactivity, and thus escaped national humiliation, for there were few organized governments on the face of the earth that did not possess enough naval force to drive our few ships off the seas and devastate our home coasts.

Except for a slight recent revival, that will be referred to in its proper order, the fashion for monitors reached its height in the United States immediately after the battle in Hampton Roads, flourished for a year or two, and then subsided with all other considerations relating to the naval requirements of our country. It is to Europe, therefore, that we must look for the real application of the lessons derived from the Monitor, and for the evolution of the battleship. The principle of the revolving turret for a gun-shield was immediately taken up abroad, and in tracing its adoption we are confronted at the very outset with a controversy as to whether or not Ericsson was the originator of that system.

During the Crimean War, Captain Cowper Coles of the British navy had had constructed and sent into action a little turret ship, or "cupola" ship as he called it, named Lady Nancy, which was little more than a raft with a shielded revolving gun mounted on it. From that time forward he had been busily engaged experimenting with his idea and writing pamphlets and memorials to the Admiralty regard-

ing it. His work was entirely independent of that which Ericsson was doing at that time along the same lines. His representations made no more impression upon the conservative Admiralty than had Ericsson's claims for the screw propeller twenty years before, and the application of armor in the British navy would probably have been limited for an indefinite period to plating broadside ships but for the sudden interest in turrets awakened by the appearance and performance of the Monitor. A seaman of the old school by profession and training, Captain Coles was hampered in his inventive efforts by a lack of the mechanical knowledge and aptitude that so distinguished Ericsson; in consequence he had to call to his aid engineers and architects to develop his ideas, and thus lost to himself credit as an originator or inventor, but with such technical help the turret that bore his name possessed certain features that were considered superior to Ericsson's.

The primitive idea in the Coles turret was a turntable, 20 or 25 feet in diameter, fixed level with the deck, and on which was raised a conical or vertical building, or cupola, of wood about two feet thick, to which as a backing the armor plating was attached; the circumference of the cupola was pierced with port-holes for one or two guns, according to the size of the ship. The table was supported on a strong central pivot, with rollers at the circumference moving on the metal surfaces of

the supporting platform and the under face of the moving floor; an arrangement of toothed pinions and segments turned the table and guns around to the desired line of fire. The use of supporting rollers at the circumference was decidedly better than the Ericsson system of bearing the entire weight of the turret on the central spindle. Another good feature that Ericsson's turret lacked was that the base of the turret, instead of standing on the upper deck, thus exposed to danger of jamming by the impact of shot, was supported on the deck below, and thus protected by the ship's sides from direct injury. This inclosed deck, from which there was free access to the turret base and mechanism without exposure to fire, allowed several methods of turning the turret to be safely employed. In practice, the lower part of Coles's turret was fitted for the application of tackles and capstan-bars as emergency methods of turning if the usual rack and pinion mechanism should become deranged.

Though unable to convince his own countrymen, Captain Coles succeeded in inducing the Danish naval authorities, in 1861, before the Monitor was built, to undertake the construction of a vessel with his turret system. The ship, named Rolf Krake and launched in 1863, was built in Glasgow by Napier on an order from Denmark, and is noteworthy as the first turret ship built in Europe, and the first outside the United States to be engaged in battle. She was armored her whole

length from the upper deck to three feet below the water line with 4½-inch iron plates. There were two Coles turrets, or cupolas, each containing originally two 68-pounder guns, but later changed to one 8-inch Armstrong gun each. The length of the ship was 185 feet 2 inches; beam, 38 feet 3 inches; draft of water, 9 feet 2 inches; and displacement, 1325 tons. She had three masts and full sail power. In 1864, when Denmark was assailed by powerful neighbors, the Rolf Krake made a brave resistance against a much superior naval force, and received a great many hits from large projectiles without material damage.

This ship was in no way the result of the building of the Monitor, and would have been built exactly as she was had there been no civil war in America. It is doubtful if the example of the Rolf Krake alone would have given an impetus to the turret idea, as naval sentiment among the great European powers clung to the time-honored broadside ships. Though the English did not at once undertake turret ships for themselves, they began building them for others, taking encouragement from the exploit of the Monitor, but adopting the Coles system of turrets. The kingdom of Prussia ordered its first ironclad in England at this time, the ship, named Arminius, being launched in 1864; she was almost an exact copy of the Rolf Krake, though slightly larger. Another development of the Rolf Krake appeared in the

Italian Affondatore, launched by the Millwall Shipbuilding Company in 1866, and engaged in the battle of Lissa the same year, though with no great credit to herself. She was much larger than the turret ships that immediately preceded her, being of 4100 tons displacement, and had an enormous ram projecting 26 feet beyond the stem. The Dutch also ordered some Coles turret ships at this time, their first one, the Prince Henry of the Netherlands, being launched by the Messrs. Laird at Birkenhead in 1867.

During this period a number of small turret ships were built in England for South American nations, the most important being the Huascar for Peru and the Bahia for Brazil. As one of the stages in the evolution of the battleship and as a vessel whose career has influenced naval precedent, the Huascar deserves particular mention. Built by the Lairds at Birkenhead under direction of Coles, and launched in 1866, she was in several respects an improvement upon similar ships of the same period. The iron hull was of unusual strength and was divided into water-tight compartments inclosing the base of the turret, machinery, and boilers, under which vital parts a double bottom was provided. She had a swan-breasted ram bow, sharp stern, single screw, and three-fourths sail power on two masts; the length was 200 feet; beam, 35 feet; draft, 14 feet, and displacement, 1800 tons. An armor belt $4\frac{1}{2}$ inches

thick amidships and tapering to 2½ inches at the ends encircled the ship; the single turret contained two 300-pounder guns protected by 5½ inches of armor on 14 inches of teak backing. A top-gallant forecastle and poop cabin prevented direct ahead and astern fire by the turret guns, which defect was partially offset by three light shell-guns on the upper deck aft. The bulwarks or rail plating was made to let down in the wake of the turrets to permit unobstructed range of fire.

The first notable performance of the Huascar was in "standing off" two large British men-of-war in a pitched battle of almost three hours' duration. The navy of Peru has always interested itself in politics, and in 1877 the crew of the Huascar mutinied because a presidential election was not progressing to suit. The ship went to sea, and by so doing became a pirate in the eyes of the law, for there was no recognized nation to which she belonged or owed allegiance. The English rear admiral, De Horsey, on that station, conceived it his duty to capture her, and set out on that mission with his flagship, the Shah, and the corvette Amethyst. The Shah was a large ship-rigged unarmored frigate of 6250 tons, 18 large guns, and 602 officers and men. The Amethyst was of 1970 tons displacement and carried 14 64-pounder guns and 226 officers and men. The complement of the Huascar was from 200 to 220 officers and men. After a week's search the

Huascar was located near the port of Ylo, and an engagement immediately ensued, the Peruvian commander having abruptly refused a summons to surrender. The Huascar was badly cut up in her upper works, — boats, masts, funnel, ventilators, and bridge, but her fighting qualities were not impaired; she had one man killed and two wounded. There were no casualties on the British ships, and their injuries were confined to the rigging. The Shah fired 280 projectiles, only 30 of which are supposed to have hit the enemy, about 30 other hits being credited to the Amethyst. The gunnery of the Peruvians was reported by the British to have been wretched, and so it must have been, considering the size of the targets they had to fire at. At one stage of the fight the Huascar closed, as if to ram, and the Shah fired a Whitehead torpedo at her, which is said to have been the first ever used in actual warfare. At nightfall the Huascar quietly steamed away, and next day surrendered to the Peruvian authorities.

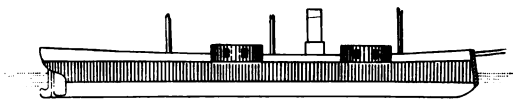
In May, 1879, the Huascar in an engagement off Iquique destroyed the Chilean corvette Esmeralda after a peculiarly bloody battle, in which the Esmeralda was greatly overmatched and in which she was rammed three times by the Huascar. The captain of the Esmeralda, Arturo Prat, was killed on the deck of the Huascar, he having boarded her, followed by only one man, the first time she rammed. Later in the summer the Huascar per-

formed the unusual feat of capturing a regiment of cavalry that happened to be afloat on a transport. In October, 1879, off Angamos Point, she was defeated and captured by two Chilean ironclads, the Almirante Cochrane and Blanco Encalada, each superior to her in force. The resistance of the Huascar in this unequal battle was such as to enroll her name permanently in the list of famous fighting ships, and to make the battle of Angamos one of the notable sea-fights of history. Her turret and pilot-house were both penetrated by projectiles, the commander, Admiral Grau, was killed, and the injury and slaughter on board was frightful; the Chilean ships also suffered severely. The Chileans repaired their prize and used her in the same war against her former country. She is still a figure in the Chilean navy and was in active service in the Balmaceda civil war of 1891.

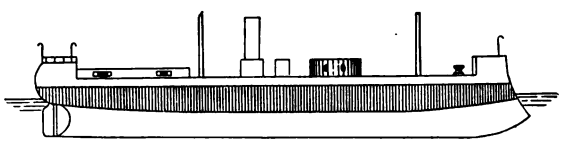
Somewhat different from the Huascar were two turret ships built by the Lairds about the same time, the Scorpion and the Wyvern, for the Confederate States of America. They were considerably larger than the Huascar, and had a turret aft as well as one forward, which were on the Coles system, each turret containing two 12-ton guns. In 1864 they were seized by the English authorities and were afterward purchased by that government. They were inferior to the American monitors in offensive and defensive properties, but the example

of their building in England led to the immediate construction of the two large turret ships that will next be described. The spectacle of these and other turret ships being built in England, combined with the tales of the Monitor, had a powerful influence on the public mind and gave an external support to Captain Coles that enabled him to overcome the stubborn opposition of the Admiralty to him and his turret. An indifferent opportunity was reluctantly afforded him to introduce his system into the British navy by putting into his hands the Royal Sovereign, an old three-decker of 120 guns that was already ruined in the eyes of the authorities by having had engines fitted on board.

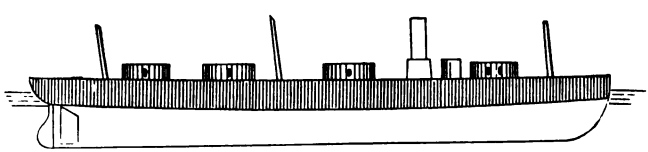
The hull of the Royal Sovereign was cut down to ten feet above the water, and an unusually strong deck built over it, sloping from the ship's sides upward to the outer circumference of the turrets. This deck, of heavy planks, was laid over one inch of iron plating, which affords an early example of an attempt at a protective deck, the same feature having appeared in the Rolf Krake and in the Monitor. The sides of the ship from the water-line up were plated with $4\frac{1}{2}$ inches of iron, and the bulwarks were hinged so as to be let down, as in the Huascar. There were four turrets, the forward one containing two $12\frac{1}{2}$-ton guns and the others one each of the same size. These turrets were $13\frac{1}{2}$ feet high, but only about five feet of the



The Rolf Krake. (*See page 226*)



The Huascar. (*See page 228*)



The Royal Sovereign

EARLY FOREIGN TURRET SHIPS

launched in 1867, and was a very large ship for that time: displacement, 8300 tons; length, 330 feet; beam, 57½ feet; and mean draft, 24 feet. An armor belt extended entirely around the hull, rising in the central part to form a sort of citadel for the protection of the lower parts of the turrets and machinery. The turrets were placed rather close together on the centre line of the ship and carried two 25-ton guns each. At the bow and stern, armored walls or bulkheads were carried up to protect smaller, but fairly heavy, guns placed in battery at the ends of the ship. The all-round feature of the turret system was thus sacrificed, as these bulkheads masked the fore-and-aft fire of the turrets. The vessel was rigged as a three-masted ship with full sail power. Coles's turret system was adopted, but the design of the ship was by the construction department and was not approved by Coles. He insisted on a low freeboard to reduce weights and make a smaller target for an enemy to fire at, though he approved the full sail power; he also objected to the bow and stern features that cut off the fore-and-aft fire of the turret guns.

After protracted representations and discussions, Captain Coles eventually, in 1867, obtained authority to design a ship that would embody his own views and be built under his direction free from interference by the government naval architects. The Captain, built by the Lairds at Bir-

kenhead under Coles's personal supervision, was the result. Her length was 320 feet; the beam, 53 feet; draft, nearly 26 feet; and displacement, 7900 tons. As designed by Captain Coles, she was to have 8 feet 6 inches freeboard, but by error in calculations it was found to be two feet less when the ship was completed. She was ship-rigged with full sail power, but against the views of the ablest naval architects of England, who saw danger in the union of low freeboard and wide spread of sails. The Monarch, not intended to go off the coast, had 14 feet freeboard and no more sail than the Captain. In spite of Coles's objections to the poop and forecastle of the Monarch, he found it advantageous to put both those features on his own ideal ship, and he connected them by a hurricane-deck running above the turrets and adding much to the upper weights.

The Captain had a wide armor belt from 6 to 8 inches thick, running entirely around her, and 13 inches of armor on the turrets; the latter, two in number, were placed in the centre line of the ship and were armed with two 25-ton guns each, the guns being only eight feet above the water. The ship had twin screws. She was launched in 1869 and completed in 1870, in the latter part of which year she made one or two short and successful cruises at sea, though her speed under sail or steam, or with sail and steam combined, was inferior to that of the Monarch under each of the three

conditions. The general British public regarded her as the best fighting ship in the fleet and destined to become the type of all future battleships. A few naval architects had misgivings, and the builders, in handing the ship over to the government, suggested that her stability be ascertained by heeling; this was done with fairly satisfactory results.

September 6, 1871, the Captain was cruising under sail with the Channel squadron in the Bay of Biscay. The evening came on rainy and squally with a heavy sea and falling barometer, from which it was known that bad weather was at hand. The ships gradually shortened sail and shifted to steam power, until about 1 A. M. of the 7th, when a furious squall struck them and the remaining sails were furled. The Captain, next in line behind the flagship Lord Warden, was at that moment observed by the admiral to be closing up under steam, with no sail on except close-reefed topsails and foresail, and heeled considerably to starboard, the wind being on her port side. The signal "open order" was made by the flagship and answered by the Captain and others, the intervals between the ships being then opened out accordingly, and soon thereafter the Lord Warden lost sight of the Captain's light in a fierce gust of wind and rain. Toward morning the wind abated and the stars came out, but the ships were so scattered that they could not be identified by their

lights visible here and there across the dim sea. At daybreak it was noticed that there were only ten ships in sight instead of eleven, and as soon as light permitted full investigation a fear of the admiral turned to dreadful fact. The Captain was gone!

The fleet dispersed in search and found wreckage that proved to a certainty that the missing ship had foundered in one of the violent squalls during the dark hours of the night. The fastest ship in the squadron, the Inconstant, was ordered to steam at full speed to Plymouth to carry home the awful tidings that spread consternation and woe throughout the length and breadth of England. Of over 500 officers and men only 18 survived, they having gained a boat left floating as the ship went down, and in it made their way with toil and suffering to the rugged coast of Finisterre. From them it was learned that the Captain had rolled heavily in the cross sea and showed so little buoyancy that the rolls were slow, sullen lurches, putting the lee rail under water, and creating doubt as to whether she would return or not. At last an unusually heavy squall struck her and she did not return, heeling over slowly and steadily until she capsized and dropped out of sight, a coffin for her crew in the depths of the ocean. So deliberately did she turn that the angles of heel called to Captain Burgoyne by a man at the tell-tale came at appreciable intervals: "Eighteen

degrees! Twenty-three! Twenty-eight!" It was only a British seaman calling commonplace numbers, but commonplace as they were, they were the words of tragedy. Indeed, the mind can imagine nothing more awful and tragic than the plight of a great ship in darkness and storm slowly rolling to certain doom, and beyond all hope of human aid. One hideous detail of the calamity was the shifting of the boilers as the ship neared her beam-ends and a mighty roar of steam from the broken pipes rushing out of the smoke-pipe, in which din were plainly heard the cries of firemen pinned in the burning, scalding hell below.

No officer escaped from the Captain. Regarded as the finest specimen of a war-ship afloat, duty in her had been much sought, and she had on board representatives of several of the most distinguished families of England. Her captain was the son of Sir John Burgoyne, and grandson of the General Burgoyne whose disaster at Saratoga furnished the American colonies with the turning-point toward success in their war for independence. Captain Coles, the designer, was on board as a guest of the commander. His tragic ending in a fabric of his own making has afforded the champions of Ericsson in the turret controversy a gloomy but satisfactory instance of retributive justice. As a matter of truth, however, the Coles type of turret had no part in the combination of defects that was fatal to the Captain, and features

of his turret have been perpetuated and have had an influence in the development of the battleship to quite as great an extent as have those peculiar to Ericsson's conception.

Some good is proverbially said to result from evil, and in this case the good was great. The disaster led naval constructors to pay great attention to the stability of ships, a matter that up to that time had not been thought of much consequence, and the number of vessels lost by capsizing has as one result been remarkably decreased. The magnitude of the Captain tragedy also called a halt to amateur designers, and proved that naval construction must become an exact science and not be left to the rule-of-thumb methods of broad-axe shipwrights. Nothing perhaps has contributed more than this disaster to raise the business of shipbuilding from a trade to a profession, and to lead to its recognition as the most serious and responsible of all the sciences connected with naval affairs. Seamanship is a difficult and intricate art, but no amount of skill and knowledge can save a ship, as in the case of the Captain, that is put afloat with inherent and incurable defects by incompetent designers or builders.

The combination of sails and much top hamper proved fatal to the Captain in connection with her low freeboard, and after her example the British authorities abandoned sails for that class of fighting-ships, though retaining them out of deference

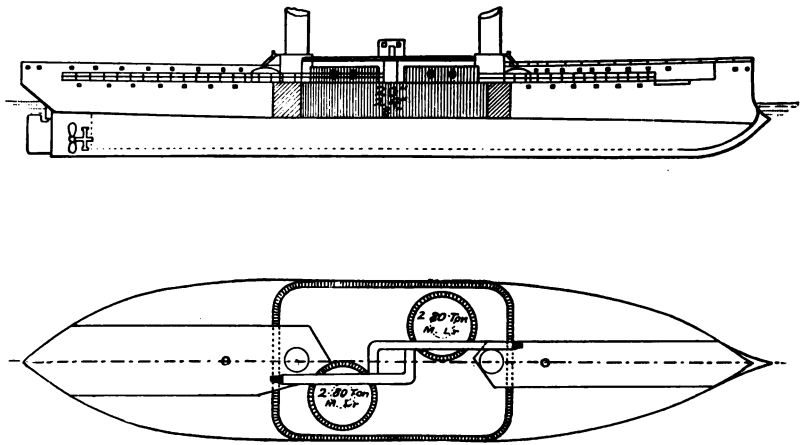
to tradition for many purposes. The chief constructor of the British navy, Sir Edward J. Reed, had earnestly opposed the design of the Captain, knowing that the sails were dangerous, and believing that the American system of turret ships was the true one. After the visit of the Miantonomoh to England in 1866 he began working out plans for a mastless seagoing turret ship, the work maturing in 1869 with the designs for the Devastation and the Thunderer, the first launched early in 1871 and the other a year later. They were sister ships, alike in all principal dimensions, and differing only in some details of construction and in type of propelling machinery. It was admitted that they were evolved from the American monitors Dictator and Puritan, though larger and more formidable in every way. The Devastation was 285 feet long, 58 feet beam, nearly 27 feet draft, and 9387 tons displacement. The freeboard of the hull proper was only four feet, strictly following the monitor type, but a forecastle and side superstructures for crew space made the height of the sides above water from eight to eleven feet except at the after part of the ship, where it was only four feet. The two turrets were on the centre line of the ship at the ends of a central citadel or breastwork 9 feet above the water line and about 150 feet long; the armor on the turrets was 12 and 14 inches in thickness; on the breastwork, 10 and 12 inches, and on the sides of the

ship, 10 and 12 inches. Each turret contained two 35-ton guns mounted about 14 inches above the water. The guns of the forward turret of the Thunderer were soon replaced by two 38-ton guns of 12 inches bore, operated by hydraulic power.

Immediately following these great monitors came the Dreadnought, originally named Fury, which may be described as a Devastation of greater growth, being 1000 tons heavier, with thicker armor and bigger guns. The next step in the development of the sea-going turret ship was the Inflexible, laid down in 1874 and launched in 1876. This ship shows in several features the keenness of the rivalry in war-ship construction then progressing in Europe, and is chiefly remarkable for the advance in armor and armament she exhibited. Instead of the maximum armor thickness of 14 inches of the Devastation she had armor as thick as 24 inches, and in place of the 38-ton guns of the Thunderer she mounted in each of her two turrets two 81-ton guns. The location of her turrets was a great departure from previous practice: instead of being directly forward and aft of each other on the centre line of the ship they were placed at the diagonally opposite corners of a rectangular armored citadel occupying the central part of the ship. The combination was well described as a floating turreted castle. The advantage of this arrangement was that the turrets did not mask the fore and aft fire of each other, and each

could with the location of superstructure bulkheads shown by the drawing, fire directly ahead or astern, as well as on either broadside. The Inflexible was 320 feet long, 75 feet beam, and of 11,400 tons displacement, being by far the largest ship-of-war constructed up to that time. There was no side armor on the hull forward or abaft the central citadel, which was a departure from the practice followed in former turret ships. Several vessels of the Inflexible type followed her, but she stood for several years as the high-water mark in the rush for heavy armor and ordnance in England.

Contemporary with the Devastation and Thunderer, or slightly ahead of them in point of time, appeared a number of smaller turret ships designed for coast defense and representing better than the big sea-going ships the true development of the monitor type in England. Of these, the Cerberus, Magdala, and Abyssinia, projected in 1866 by Mr. Reed for the defense of colonial harbors, were pure types of the improved American monitor, in which were combined the good features of both the Coles and the Ericsson turrets. They were of about 3000 tons displacement and carried two 18-ton guns in each of two turrets. They were completed in 1870, and were followed the next year by four others of practically the same class, — Cyclops, Gorgon, Hecate, Hydra. Immediately after these came the Rupert, Glatton, and Hotspur, the first two of about 5000 tons displace-



H. M. S. INFLEXIBLE, 1876

Space forbids an account of the experiments and types of battleships peculiar to this period when old traditions and new inventions were in conflict. Every one agreed that armor was essential, but in almost everything else there was much dispute and difference of opinion. The advocates of the old time-honored and history-proved broadsides were temporarily discomfited, but their guns soon reappeared in the form of an auxiliary battery, the turret ship Inflexible, with eight 4-inch guns in addition to her main battery, being the first instance of this kind. A persistent effort was made to preserve the traditional "ship-shape" appearance of war-vessels by retaining masts and sails; these, as we have seen, were entirely dispensed with on the early low-freeboard turret ships, but other armorclads, whether broadside or box-battery ships, were for many years fully sparred; this in spite of the well-recognized fact that sails and steam were incompatible powers, requiring very different forms of hull for their best results. Without attracting as much attention as the rivalry between guns and armor, steam gradually gained the upper hand on its own merits in the struggle with sail power, and, from being in the beginning a mere adjunct, soon became the main motive power, and finally the only one.

Because of the many forms of armored ships that were in favor for a short time and were then superseded by improvements, and because of the

various methods in vogue from time to time of arranging guns in battery, it is wholly out of the question to indicate in order of time the evolutions that produced the modern battleship. The study is much complicated also by the contemporary growth of types other than battleships, — armored and unarmored cruisers, gunboats, torpedo-boats, and other special forms. The ironclad battleship of the present may be said to be a union of the turret ship of about the Inflexible class with the central citadel or box-battery ship, to which union the older broadside type also contributes certain features. The broadside yielded to the central battery arrangement, and that in turn to the turret. A modification of the turret, or rather a combination of it with the box-battery system, is the barbette, much used abroad but never in much favor in the United States. Its peculiarity is that instead of the circular armor wall revolving with the gun as in the case of the turret, it remains fixed, and the gun revolves inside on a turntable, as in a fort. The modern battleship mounts a limited number of heavy guns in dispersed positions in turrets or barbettes, with a secondary battery of smaller and more rapid firing guns in broadside.

After the foregoing explanation, we will return for a moment to the history of battleships in England where we left that subject at the Inflexible. The immediate successors of that ship, the Ajax and the Agamemnon, were of much the same general

design, but were smaller and inferior in every respect. The next battleships, the Edinburgh and the Colossus, launched in 1886, with the Inflexible disposition of turrets, were a great step in advance. They had breech-loading guns, the old-time muzzle-loaders having last appeared on the Ajax, and a better proportion of length to breadth of hull made them about three knots faster than their immediate predecessors. Immediately after the Colossus is the "admiral" class of battleships, of which the Anson may serve as the type. They were a little larger and faster, and showed the greatest advance over the ships that were just before them in the breech-loading barbette guns, that were of 67 tons instead of 45 tons. They had, in addition to four of these great guns, six 6-inch guns in a broadside battery. From the period that we have now reached, the growth of the United States navy will carry forward the development of the monitor idea; but before leaving the English navy it is pertinent to mention two fine battleships of the year 1887, — the Nile and the Trafalgar, — because in them, after a lapse of about ten years, the pure monitor type was revived, they being improved Devastations, larger, swifter, and more formidable.

In the construction of the French armored fleet, which was contemporary with the same work in England, we find much less of direct bearing on our subject. In disposition of armor and dimensions

of hull, the French had hit upon a much better combination in La Gloire than had the English with the Warrior, and they therefore had less occasion for changes and experimental types. As a result of their good beginning, their ships were more uniform than those of their neighbors, but, like the English, they progressed from the broadside to the central battery type, and from that to the barbette with auxiliary broadside battery. The turret has not been much used on French battleships, though adopted to some extent in small special-service vessels, the barbette having been more in favor. As already stated, the French bought the American double-turreted monitor Onondaga in 1866, and she still figures on their navy list as a coast-defense vessel, but they have not seemed disposed to copy the type. In this connection it is interesting to note that of the great number of monitors built in the United States, and in spite of the willingness of our government to dispose of them after the Civil War, only two besides the Onondaga ever got into the hands of other nations. These were the double-turreted vessels Catawba and Oneota, built in the Mississippi Valley, and sold to Peru in 1868.

The first French turret vessel was a small monitor ram, the Taureau, built in 1863, which was an amplification of Captain Coles's Lady Nancy of the Crimean War period rather than an offspring of the American monitors. The turret was well

forward, and did not revolve, having four ports for bow and beam fire. Four other rams, the Bouledogue class, more like the American monitors, were built immediately after; these had a single revolving turret each, armed with two 24-centimetre guns. All had wooden hulls, and it is noteworthy that the French built their war vessels of wood until 1872, though iron became the building material in England with and after the Warrior of 1859. Four coast-defense vessels with one turret each, the Vengeur class, very similar to the British Rupert, were built in 1872, and several similar but larger vessels, with barbettes instead of turrets, followed soon after. Generally speaking, the American monitor has not greatly influenced the characteristics of French shipbuilding.

Germany, or Prussia, was not a naval power in the days when the armored ship was growing into being, and therefore contributes nothing to this investigation. The early German ironclads were mostly built in England or France, and of course had the chief features of ships built by those countries for themselves, resembling in general the English types rather than the French.

Italy followed closely the French broadside ironclads, without much experiment with turrets. In one instance, however, she took the lead even of England in the development of the armored turret ship. It has been mentioned that in the Inflexible the belt armor was omitted, and all armor was con-

centrated on the central citadel and turrets. The determination to dispense with bow and stern belt armor originated with the Italians, and was put in practice by them in the Duilio, begun at Castellamare in 1872, launched in 1876, but not completed until 1880. She has two turrets arranged as described in the case of the Inflexible, each turret carrying two 100-ton Armstrong guns. A sister ship, the Dandolo, followed soon after. It is admitted by English naval writers that the designs of the Duilio were copied in the Inflexible.

The nations of northern Europe introduced the American type of monitor almost without change. Sweden, Ericsson's native land, had as much pride and faith in his achievement as the Americans had, — possibly more, — and at once began the building of monitors from his plans, but it was not until 1865 that the first one was launched. This was named John Ericsson, and was armed with two 15-inch American (Rodman) guns, presented to Sweden by Ericsson. Three other monitors of the same class soon followed, very much the same as the Passaic class except that they had 9½-inch guns made in Sweden. Norway, between 1866 and 1872, built five vessels very similar to the Swedish monitors, but armed them with 11-inch Armstrong guns.

Russia, the hereditary enemy of Scandinavia, checkmated the monitor move of Norway and Sweden by obtaining plans of the Passaic class

from America and building from them ten vessels that were all launched in 1864. These had exactly the same dimensions as the Passaic class, but varied considerably in displacement. They each had two 9-inch rifled guns, and, though copies of Ericsson's ships, possessed certain features that were improvements: the turret, for instance, was made of such large diameter that the guns could be placed far enough apart to allow a clear fore and aft fire past the smokepipe. The junction of the turret with the deck was protected by a glacis, which was the development of a protecting ring introduced by Ericsson in his later monitors after service by the Passaic class had shown the base of the turret to be a vulnerable spot. At about the same time, the Russians had a small double-turreted monitor built in England on the Coles system. In 1867 and 1868 they built two larger double-turreted monitors in imitation of the American type, and four much larger seagoing low-freeboard turret ships named for Russian admirals. Two of these latter had three turrets each, and the others two; one of the three turret ships had two guns in each turret, but in all the others there was but one gun to each turret. They were of about 3700 tons displacement, and were intended to be fully rigged ships like the Captain, which they much resembled, but the loss of that ship before they were fully completed caused the rigging to be abandoned. An important amplifi-

cation of the monitor in Russia appears in the Peter the Great, launched in 1872 but not ready for sea until 1875. This ship, 320 feet long and of over 9600 tons displacement, was remarkably like the Devastation in general details, and actually larger and more formidable than that huge English monitor.

Russia furnished the example of the most abnormal development that the monitor type has undergone, in the "Popoffkas," so named in honor of their designer, the Russian admiral Popoff, two steam batteries that were perfectly circular, propelled by six screws, and mounting in a central circular barbette two heavy guns commanding the whole horizon. They were built about 1873, and were intended for coast-defense purposes in the shallow waters of the Black Sea. The smaller one, named Novgorod, was 101 feet long and 101 feet beam, or, more properly described, was 101 feet in diameter, and only 13 feet draft; the displacement was about 2500 tons. The sides were only two feet above the water, but the upper deck curved upward so much that in the centre it was five feet above the water line; from this elevation the turret, or barbette, mounting two 11-inch 28-ton guns, rose seven feet higher. A light deck-house forward furnished quarters for a portion of the crew. The armor on the sides and on the barbette was 11 inches thick, and the thickness of deck plating was about three inches. The hull was

built of Russian iron and had on the flat bottom twelve parallel keels each eight inches deep. The other one of these curious crafts, the Vice Admiral Popoff, was 1000 tons greater in displacement than the Novgorod, 20 feet more in diameter, and mounted two 41-ton guns, while the side and barbette armor was eighteen inches thick. These vessels were slow and unmanageable, and were considered failures.

In the United States, complete apathy held sway during all these years when other nations were rebuilding their fleets. Such attention as the navy received from Congress was of destructive rather than beneficial character, and consisted of appropriations that were manifestly inadequate for carrying out their objects. Under such a system of neglect, our ships and naval property at shore stations slowly decayed and became unserviceable, until the naval establishment was the cheapest and most useless branch of the government. One Secretary of the Navy, realizing that the time was rapidly coming when there would be no seaworthy vessels remaining to perform even the ordinary duties of the service, broadly construed his authority to use the meagre appropriations for "repairs" placed at his disposal, and had a number of ships built that were fairly useful though of a type already out of date. These were mostly wooden corvettes or sloops-of-war with both steam and sail power, built as entirely new vessels and bearing

the names of old sailing-sloops or steamers that had fallen into hopeless decay, but appeared on the navy register as being under repairs. This proceeding, which probably lacked strictly the warrant of law, finally led to investigations by committees of Congress and condemnatory resolutions directed at the Secretary of the Navy and some of his principal subordinates in the Navy Department, but the resolutions were never acted on. The main result, therefore, was that a few serviceable vessels were added to the navy, and its complete dissolution thus prevented.

Besides the wooden ships built around old names in this way, new iron ships were begun as "repairs" to the big unfinished monitor Puritan and the four wooden monitors of the Miantonomoh class. Because of limited appropriations this commendable work progressed slowly for a few years, and was then abruptly stopped by the Congressional investigation when the ships were still in a very incomplete state. They remained for some years at the shipyards of the contractors, running up bills for the rent of the space they occupied, and were finally taken in hand by the government. By the year 1881 the American fleet had reached such a state of worthlessness that a board of prominent officers was organized to consider the situation and advise the Secretary of the Navy as to what should be done. The report of this board, which recommended an extensive building programme, was sent

to Congress at the end of the year with a statement from the secretary setting forth the dilapidated state of the navy. The situation was so discreditable that the same year the President referred to it in his annual message to Congress and pointed to the necessity for immediate action if the American navy was to be saved from total disappearance. The advisory board had recommended the immediate building of sixty-eight vessels of war of various types. Congress, after eight months' deliberation, authorized the building of *two* unarmored cruisers, which shows how low the navy had fallen in public esteem and what little interest and pride in its welfare was felt by national legislators. At its next session, Congress modified its act to the extent that three cruisers, much smaller than the ones first appropriated for, and one iron dispatch-boat were authorized in place of the two cruisers originally provided for.

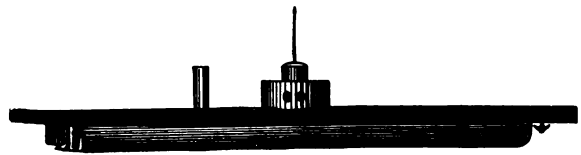
The first of these acts, which bears date of August 5, 1882, appropriated $400,000 for temporary work on the five monitors before referred to, the principal work authorized being the launching of the hulls so they could be removed from the contractors' yards. The act specified that no other steps be taken toward completing these vessels until a further order from Congress. The next naval bill appropriated $1,000,000 for machinery for these double-turreted ironclads, but the appropriation bill of the following year, approved July 7,

1884, directed that all work on them should cease, and that any part of the previous appropriation remaining unexpended should be returned to the treasury! It taxes one's patience to encounter such instances of legislative frittering and hauling at cross purposes. The general deficiency bill of the very next year contained items amounting to considerably more than $200,000 to pay contractors for the use and occupation of their premises by these hulls lying idly in them. In 1886 an act to increase the naval establishment directed the completion of these monitors and appropriated over $3,000,000 to begin the work. As the work of completion was undertaken at navy-yards and depended from year to year upon Congressional action it did not advance rapidly, and it was ten years before the last of them was ready for commission.

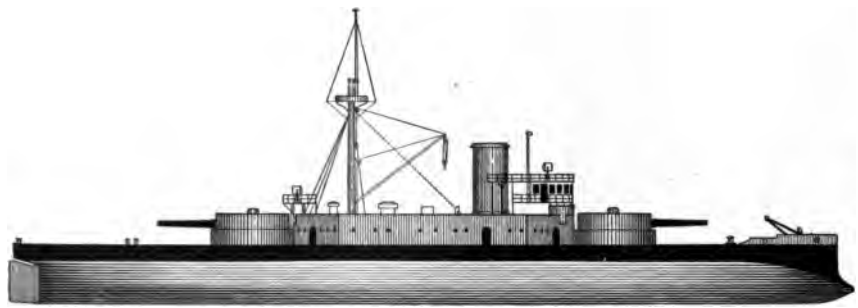
The new Puritan is, omitting inches, 290 feet long, 60 feet beam, 18 feet mean draft, and of 6,060 tons displacement; she has horizontal twin-screw compound engines of 3700 horse-power, calculated to give the ship a speed of twelve knots per hour. Each turret contains two 12-inch breech-loading rifled guns of modern pattern, worked by hydraulic power; besides these she has six 4-inch rapid-firing guns and eleven smaller rapid-fire or machine guns. The armor on sides and turrets varies from six to fourteen inches, and the bases of the turrets are protected by barbettes fourteen

inches thick. A superstructure between the turrets on the upper deck furnishes comfortable quarters for officers, but detracts considerably from the pure monitor features of the vessel. The four smaller ones — Amphitrite, Miantonomoh, Terror, and Monadnock — are of the same principal dimensions, but differ to some extent in details of arrangement, manner of working turrets, machinery, etc. They are 260 feet in length, 56 feet beam, 15 feet draft, and of about 4,000 tons displacement. Each has four 10-inch rifled guns arranged in pairs in the turrets, and a number of smaller guns for a secondary battery. All but the Monadnock have antiquated machinery and are of low speed.

Besides directing the completion of the double-turreted monitors, the naval bill of August 3, 1886, provided for the first battleship for the United States navy, though the result was an example of English rather than of American methods. Because of lack of experience at home it was thought proper to procure plans for this ship in England, in which country the United States offered a prize of $15,000 for the best design of a battleship that a competition would bring forth. The plans thus secured were for a ship that was built at the Norfolk navy-yard, and named Texas. The propelling machinery was obtained by contract from the Richmond Locomotive Works, of Richmond, Virginia. Owing to doubts as to the practicability of the



THE MONITOR PASSAIC, 1862. (See page 216)

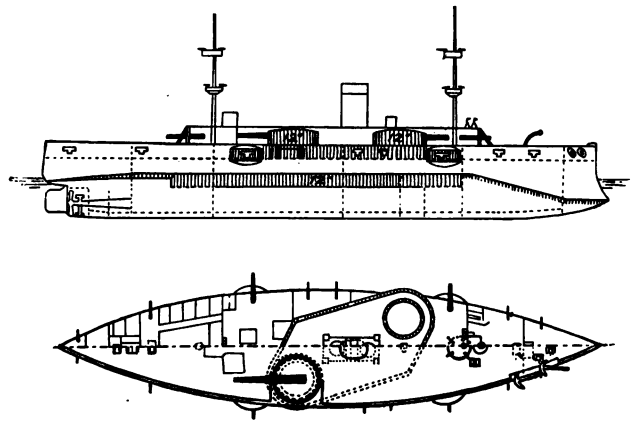


THE MONITOR PURITAN, 1896

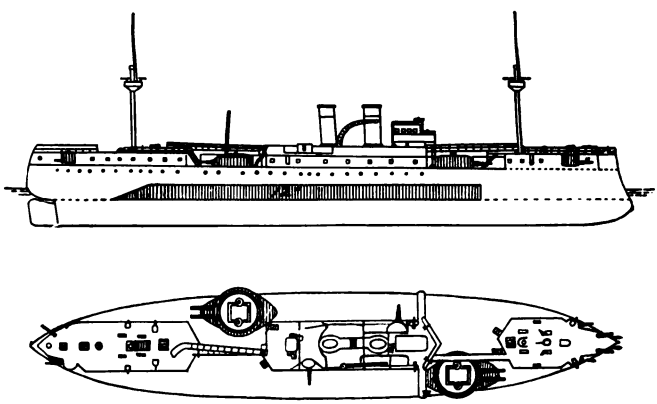
two turrets of the monitor type, each mounting two 10-inch guns, arranged on opposite sides of the upper deck, one well forward and the other aft, but not protected by a redoubt or citadel.

The naval appropriation act of 1887 directed the construction of some cruisers and gunboats, and one monitor, — the Monterey. This vessel is almost a copy in principal dimensions of the Miantonomoh class, but being of a so much later date is built of better material and is an improvement upon that class in all respects. She has twin-screw triple-expansion engines of 5,000 horse-power, which is more than three times that of the Miantonomoh class, and is consequently much faster. Her forward turret contains two 12-inch rifles, and the after turret two 10-inch; she has the usual supply of small guns. Two years later, in 1889, Congress authorized the building of what it styled an "armored steel cruising monitor," of about 3,000 tons displacement and a sea speed of seventeen knots. The qualities the law required for this vessel were so difficult or impossible to fulfill that no contract for its construction was ever made.

The distinctively American battleship dates from the year 1890, when Congress authorized the building of "three seagoing, coast-line battleships, designed to carry the heaviest armor and most powerful ordnance . . . and to have the highest practicable speed for vessels of their class, to cost, exclusive of armament and of any premiums that



U. S. S. Texas



U. S. S. Maine

SECOND-CLASS BATTLESHIPS

These battleships are wholly of American design, and are much different from the same class of ships contemporary with them in other countries. In them the diagonal arrangement of turrets is abandoned and the two main turrets, each mounting two 13-inch rifled guns, are placed on the centre line of the ship at a distance apart equal to about one half the length of the ship. With their low freeboard (about eight feet) and these enormous turrets they are in appearance and reality magnified monitors, of which type they are the lineal descendants. A central superstructure between the turrets contains four 6-inch guns and affords space on its top for a large secondary battery of small guns. With the number and arrangement of guns described, the Oregon class is not greatly overmatched by foreign battleships of like size; but the American ships possess another battery intermediate to the turret and secondary guns that makes them superior in gun power to anything near their size afloat.

At the corners of the superstructure, and standing higher than the tops of the 13-inch turrets, are four other turrets, each mounting two 8-inch guns, the location and arrangement being as shown by the outline battery and armor plans here introduced. From these it will be observed that eight turret guns and two of the four 6-inch guns may be fired on each broadside, and that six of the turret and two of the broadside guns may be trained

directly ahead or astern. The secondary battery, not shown by the drawings, has an equally wide range of fire. It has been asserted by European critics that these battleships are over-gunned, but they have carried their heavy batteries safely on long sea voyages, and have all been in situations recently where the great weight of guns on board was not detrimental to their welfare and safety. A graphic comparison of these ships with similar ones built at exactly the same time in Europe will be interesting to show the extent that American ideas of war-ships differ from the most expert foreign practice. In illustration, the drawings of the first-class battleships Barfleur and Centurion of the British navy are shown. These ships were completed in 1894, and are of 10,500 tons displacement, 360 feet long, and 70 feet beam, or only very little larger in chief dimensions than the Oregon class. The batteries of the two classes are as follows: —

OREGON.	CENTURION.
Four 13-inch rifles.	Four 10-inch rifles.
Eight 8-inch rifles.	Ten 4.7-inch rifles.
Four 6-inch rifles.	. . . . .
Twenty 6-pounder rapid fire guns.	Eight 6-pounder rapid fire guns.
Six 1-pounder rapid fire guns.	Twelve 3-pounder rapid fire guns.
Two Colts machine guns.	Seven light machine guns.
Two 3-inch field guns.	Two light field guns.

As a partial offset to this inferiority in battery, the British ships have about 3,000 more horse-power and between two and three knots greater speed than the American ships, which advantage might prevent defeat if it did not lead to victory, for speed is now recognized as one of the chief factors in naval warfare.

Though designated as "coast-line battleships" and intended only for home defense, the ships of the Oregon class have proved in a conclusive manner their fitness for ocean cruising. The example of the Oregon herself is unequaled in the history of battleships, and is remarkable enough to deserve a brief review. This ship left the naval station at Bremerton, Washington, March 6, 1898, and arrived at San Francisco, March 9, where she filled up with coal and ammunition in obedience to orders from the Navy Department. She left San Francisco, March 19, and arrived at Callao, Peru, April 4, having made an average speed of 10.7 knots on the run of about 4000 miles. At Callao the engines were adjusted and the boilers cleaned, while 1100 tons of coal, that had already been bought and loaded on lighters by the gunboat Marietta, was being hurried on board. On April 7, after three days of this work, the Oregon proceeded, and appeared in Magellan's Straits on the 16th, having averaged $11\frac{3}{4}$ knots during the whole voyage, made in a heavy swell that kept the decks flooded and caused much racing and vibration of the engines.

At Sandy Point more coal was obtained, and on the 21st the ship passed out of the Straits into the Atlantic, her progress being somewhat retarded by the company of the slower Marietta. On April 30 they arrived at Rio de Janeiro, and heard for the first time of the existence of war between the United States and Spain. They left Rio de Janeiro May 4, having in company the Nictheroy (Buffalo), and with a warning from home that a formidable Spanish fleet was on its way to American waters. On the 8th, the Oregon, having left her consorts behind because of their slow speed, stopped at Bahia to communicate with the Navy Department, leaving there the next day and stopping eighteen hours off Barbados on the 18th. The next heard of the Oregon was her telegram from Jupiter Inlet on the coast of Florida, announcing her arrival there May 24, in perfect condition, from which place she was ordered to join the fleet of Admiral Sampson operating against the enemy in the West Indies. "It is difficult," says Captain Mahan, "to exaggerate the honor which this result does to the officers responsible for the condition of her machinery. The combination of skill and care thus evidenced is of the highest order." In describing the high spirit that animated his crew, Captain Clark of the Oregon reports instances of officers voluntarily doubling their arduous watches in the engine-rooms when high speed was to be made, of attempts of men to return

to work in the firerooms after having been carried out insensible, and of officers manning wheelbarrows to assist in the work of coaling ship.

In the long sea vigil off the harbor mouth of Santiago de Cuba, instituted by Admiral Sampson to prevent the escape of the Spanish fleet, the Oregon was a conspicuous figure. When at last the day of battle came she was found ready, and was by far the most important factor in the destruction of the enemy's ships. About a month later she steamed to New York with the victorious fleet, and there for the first time in six months her crew had the opportunity of rest and shore leave. Within less than three months she took the sea again, and retraced the long route to the Pacific Ocean, going eventually from Callao to Honolulu and thence to Manila, where she arrived March 18, 1899, just one year from the day she had left San Francisco to go to the Atlantic coast. The dispatch of Admiral Dewey announcing her arrival at Manila added: "The Oregon is in fit condition for any duty." No other battleship, and few if any ships-of-war of any class, can boast of such a record of sea miles steamed over or of stirring events participated in within the short period of one year.

Very similar to these three great battleships or monitors is the Iowa, undertaken two years later and first commissioned in 1897. An important structural difference is that the superstructure,

instead of being stopped forward and aft by the principal turrets, is carried forward to the bow, making the forward part of the ship one deck higher than the after part, which takes away the monitor appearance, but adds to the seagoing qualities. The forward turret is placed higher than the after one because of this feature. Otherwise, the general plan is much the same as that of the Oregon class, — two very large turrets on the central line of the ship forward and aft, and four 8-inch turrets in the corners of the intervening space. The main turrets mount 12-inch instead of 13-inch guns. The Iowa is 1,000 tons heavier than the class that she resembles, and is of proportionately greater general dimensions.

The later battleships for the United States navy, eleven of which are now in various stages of construction, retain the monitor feature of having the principal guns in two central turrets forward and aft, but have abandoned the smaller turrets for intermediate guns and have come back to the broadside or central-battery arrangement. This has been caused largely by advancement in mechanical processes and methods that have made much larger sizes of quick-firing guns practicable. In the older of these new ships, the Kentucky and the Kearsarge, appears the novel feature of double-decked or two-storied turrets. On top of the 13-inch turrets, and forming a fixed part of them, are the 8-inch turrets with guns laid parallel to

the larger ones below. Concentration of heavy gun fire is the advantage claimed for this arrangement. None of the other new battleships have this feature, but they all have what are known as elliptical turrets, the side of the turret opposite the long projecting guns being prolonged or "bulged" out of circular form, the object being to balance the turret and enable it to be turned more easily when the ship is heeled or rolling. The new battleships following the Kearsarge and the Kentucky in date are Alabama, Illinois, and Wisconsin, authorized in 1896; Maine, Missouri, and Ohio, authorized in 1898; and Pennsylvania, New Jersey, and Georgia, authorized in 1899.

In the spring of 1898, when the country found itself at war and its seaports liable to attack, the old Ericsson monitors were hastily fitted for service and distributed as harbor-defense vessels along the Atlantic coast. This awakened public interest in the uses of monitors, and Congress, as if to make amends for neglect during the long years of peace, immediately directed the building of four harbor-defense vessels of the pure monitor class, of small size, and carrying only one turret. These are now building, and have been named Arkansas, Connecticut, Florida, and Wyoming. As designed, they are to be 252 feet long, 50 feet beam, and have a mean draft of between twelve and thirteen feet. The turret, of elliptical pattern, is placed well forward and mounts two 12-inch rifled

guns, besides which there are to be four 4-inch rapid-fire guns, three 6-pounders, and four 1-pounders. The maximum calculated speed is only 11½ knots, but this is sufficient if the vessels are restricted to their proper sphere as harbor-defenders, and not sent on long sea-voyages or put to chasing blockade-runners. A large deck-house or superstructure abaft the turret furnishes a position for the smaller guns, but prevents the stern fire of the turret guns; its shape, however, is such that the latter can be trained all around the horizon except over an arc of sixty degrees directly astern.

We have now outlined the origin and growth of the principles that made an ironclad steamship of war possible; we have seen such a vessel, in the shape of the Monitor, created hurriedly to meet special conditions in an emergency, and we have seen how completely that vessel fulfilled its object. We have also traced the evolution of the battleship at home and abroad as influenced by the example of that rude primitive ironclad. Whatever might have been the development of fighting ships had there been no civil war in America and no Monitor, the fact remains that the Monitor is the prototype of the modern battleship. Through all the changes and developments that we have reviewed there will be observed in the truest resulting types of fighting ships a close adherence to the first principle of Ericsson's invention, which was in having the principal guns mounted in a

turret placed on the midship line of the vessel; an arrangement that is the most economical of weight and productive of the greatest power. The highest development of the Monitor, represented by the Oregon, possesses this feature unchanged, and has other qualities that overcome defects in the originals of the type. The modern monitor is very large, that its guns may be carried high, and thus capable of use in a seaway: the size permits the carrying of coal for long sea-voyages at good speed, and also, as important as any of the improvements, powerful propelling engines may be carried that enable the full-grown monitor to meet on equal terms cruisers built specially for speed, or even to outrun them as the Oregon did. The steps in naval evolution that we have looked at have all been due to the influence of the ironworker, symbolized by the steam engine. The nineteenth century began with the wooden sailing ship-of-the-line as all-powerful in naval constructions, and considered so perfect after many decades of development that its disappearance from the ocean seemed an impossible thing. Nevertheless it has utterly vanished from the face of the waters, and the century draws to its close with steam and steel as the true emblems of naval power.

CHAPTER V

PRINCIPAL ACTS OF THE NAVY IN THE WAR WITH SPAIN

THE present chapter is added simply to bring this outline of American naval history, as influenced by steam, up to the present time, and not with any wish of increasing the already confusing mass of literature on the subject of the war with Spain. That war is such a recent event that biased or imperfect newspaper reports and the extraordinarily prolific output of the magazines are still fresh in the public mind, and are so productive of error and prejudice that nothing in the nature of serious history would be accepted as final at this time. The premature appearance of many so-called histories of the war, some of them actually written before peace was restored and before official records necessary to a correct understanding of events were accessible, has greatly added to the confusion and must increase the task of the historian, who, a generation hence, may extract from all the material that will be at his hand a true account of events as they were. The pyramid of guess-work erected by over-eager writers

and publishers is a discouraging structure to explore because of its vastness, and dangerous to enter because of the treacherous quality of the material of which it is built. Avoiding it, therefore, the author will bring his narrative up to date as briefly as possible, using only as his sources of information the official reports, orders, and dispatches that have already been made public and a few published articles by responsible participants in important events, together with some personal experience and observation while the war was in progress.

The third of a century of peace that intervened between the great Civil War and the outbreak of the Spanish War was a period of miracles in the United States in the development of mechanical appliances great and small. The greatest machine that the period produced was the battleship, the evolution of which has been traced in another chapter. We have now to see this huge mastodon of steel and steam rush into the arena of strife, for which it was created, and to witness the desolation and ruin that followed its advent. It will no longer be necessary to call attention to the influence of steam in describing the operations of naval war. With the completion of the modern battleship, sails finally disappeared as a military element, and the full day of the era of steam came in. In the Spanish War steam was the factor that decided the character of every movement and

undertaking, and we may hereafter assume its influence as granted, just as we understand that wind and sail governed the actions of Nelson and Collingwood in older wars against peoples of the same race.

The work of the navy of the United States in the war with Spain may be classified under two general heads. The first relates to naval events in the Far East and is comprehended by the single word Manila. The second, of far wider scope and greater responsibilities with a corresponding measure of importance in deciding the outcome of the war, deals with the operations of our vessels on the American side of the Atlantic Ocean. Including the whole eastern coast of the United States and the ramification of waters throughout the West Indies, it embraced a wide region and required the exercise of grand strategy and a broader application of the principles of war than was involved in the hasty meeting and quick battle of the opposing naval forces in the Orient.

The problem confronting the commander of our Atlantic fleet was not limited to descending upon and destroying an enemy of known force and location, but included the protection of our seaboard cities, thought by many in authority to be in great danger, and the waging of negative war against a large army by blockading the ports upon which it depended for provisions and munitions of war. It included also, back of all other considerations,

and more important than all others together, the grand game for the control of the ocean by which the fleet of the enemy was restricted move by move until the day and hour of checkmate came. The story of the North Atlantic fleet remains untold as a splendid opportunity for a truthful and just historian, and until its true history is written the American people will not know what a debt of gratitude and honor the nation owes to the sad-faced, silent commander-in-chief who, regardless of praise or slander, steadfastly pursued to a successful end his purpose of finding and overcoming his enemy, as the only certain method of saving from devastation the shores of his country, of speedily ending the war, and of bringing his battleflags home with the historic lustre of their colors undimmed.

At the beginning of the year 1898 the condition of the people of Cuba, reached as the result of an insurrection against the lawful sovereignty of Spain, had become so pitiful as to enlist the sympathy of all civilized nations. In the United States the manner in which Spain conducted the war had been so violently denounced by the pulpit and press, and even in Congress, that a feeling of dislike toward that country had been excited in the minds of the people, and, by reaction, a similar sentiment existed in Spain toward us. With the merits and demerits of the question, as we now understand them, this narrative has no concern.

We are interested only, as a beginning for this relation, in the fact that hard feelings had grown up between Spain and the United States as a result of the rebellion in Cuba.

Still, there was no visible sign of war between the two countries. Diplomatic relations remained unchanged and people of each country could freely visit the other without much danger of harm. For more than two years the naval power of the United States had been actively and earnestly used to suppress American adventurers and speculators who sought to make money by supplying munitions of war to the Cuban insurgents, and some of these "filibusters," as they were called, who had been caught had been severely punished by the American courts. Out of deference to Spanish sensitiveness, American naval vessels almost ceased their once frequent visits to Cuban ports, and for some time the favorite winter drill grounds of our North Atlantic squadron in the vicinity of Key West had been abandoned lest the presence of a naval force so near Cuba might give offense as a seeming menace to Spanish authority. In January, 1898, however, the squadron that had been drilling all summer long off the Northern coast was sent to the warmer latitude of Key West to continue its work, and this move, though harmlessly intended, proved to be the beginning of a remarkable chapter of nineteenth-century naval history.

This squadron was commanded by Rear Admiral Montgomery Sicard, one of the oldest and most prominent officers on the active list of the navy, and consisted of the armored cruiser New York as flagship; the first-rate battleships Iowa, Indiana, and Massachusetts; the second-rate battleships Maine and Texas, and several small cruisers and gunboats. A flotilla of five torpedo-boats was also in the vicinity of Key West at the time the squadron arrived there. On the night of January 24, the ships then lying at sea between Key West and Dry Tortugas, the Maine was signaled to proceed to Havana, and immediately parted company, forever as it transpired, from the group of big ships of which she had long been a favorite and conspicuous member. Her orders on this duty came from Washington, and the Maine was selected because she had been at Key West for some time before the squadron arrived and had been asked for before that time by the United States consul general at Havana, who considered the presence of an American war-vessel desirable at that port.

After this departure, which did not excite much interest at the time, as ships were always coming and going on detached service, the squadron took up its regular routine of sea drills, using Dry Tortugas as a base for coal and provisions, and cruising in the open waters of the Gulf between Tortugas and Ponce de Leon Bay on the mainland of Florida. There were rumors from time to time

that the Maine was not wholly welcome to the official class in Havana, but no one dreamed that any harm would befall her. At daylight on the morning of February 16, the squadron then being engaged in coaling at Tortugas, the torpedo-boat Ericsson arrived from Key West with the shocking intelligence that the Maine had been blown up and destroyed with great loss of life in Havana harbor the evening before. The news seemed incredible, though the dispatches were official and direct, and the hasty judgment of the squadron was for an immediate descent upon Havana to investigate and seek redress, as would have been done in olden times when warriors instead of diplomatists regulated the intercourse of nations. No such violent move was contemplated by the officials in authority, however, and the only immediate action was the removal of Admiral Sicard, in the New York, to Key West, where he could be in closer communication with his government and in a better position to watch events.

Particulars of the awful catastrophe were soon learned. About 9.40 P. M., February 15, when nearly all the men were asleep in their hammocks, a frightful explosion tore the forward half of the ship into pieces and caused her to sink to the bottom instantly. Two officers and two hundred and sixty-four men were killed or drowned, or died subsequently of injuries, out of a total crew of twenty-six officers and three hundred and thirty-

one men. The great disproportion in the loss of life between officers and men was due to the facts that the officers' quarters were in the after part of the ship, remote from the explosion, that several officers were on shore, and that of those on board few if any were asleep. The two that lost their lives were Lieutenant Friend W. Jenkins and Assistant Engineer Darwin R. Merritt.

An American court of inquiry composed of naval officers, of which court Captain W. T. Sampson of the Iowa was president, was organized to investigate the cause of the disaster, and for several weeks engaged in a very patient and thorough examination of the wreck by means of divers and in taking testimony from the survivors. It was thought by many in the squadron — even feared, in fact, to tell the exact truth — that the members of this court were too pacific by natural inclination to accept the popular theory of deliberate destruction of the ship by external agencies, and would be disposed to find the disaster due to accidental explosion of boilers or magazines within the vessel itself, unless very strong proof to the contrary should be brought forth. At all events, the court was perfectly neutral in its attitude and rendered a finding strictly according to the testimony, possibly against the preconceived opinions of its members. In this finding the court stated that in its opinion, " the Maine was destroyed by the explosion of a submarine mine, which caused the

partial explosion of two or more of the forward magazines."

A board of Spanish naval officers conducted a similar investigation, but without any attempt at equal thoroughness, and reported that, "On the night of February 15 last an explosion of the first order, in the forward magazine of the American ironclad Maine, caused the destruction of that part of the ship and its total submersion in the same place in this bay at which it was anchored." Full reports of the proceedings of these two naval courts of inquiry are published as Senate documents, Fifty-fifth Congress, second session, and make extremely interesting reading when taken together.

In the mean while, during the long weeks that the court of inquiry was taking its testimony and preparing its finding, the people of the United States were crying for war and revenge for the slaughtered men of the Maine. Congress, March 9, under the influence of public clamor, appropriated $50,000,000 to be used "for the national defense," and the work of fitting the army and navy for war went forward with the help of this fund. Owing to the intense zeal and energy of Mr. Theodore Roosevelt, then Assistant Secretary of the Navy, and his positive belief that war could not be prevented, the Navy Department got and expended considerably more than one half of this sum, buying with it coal, ammunition, guns, and auxiliary vessels, so that by April 15, a week

before the actual beginning of hostilities, the Secretary of the Navy was able to report that the navy of the United States was ready for war.

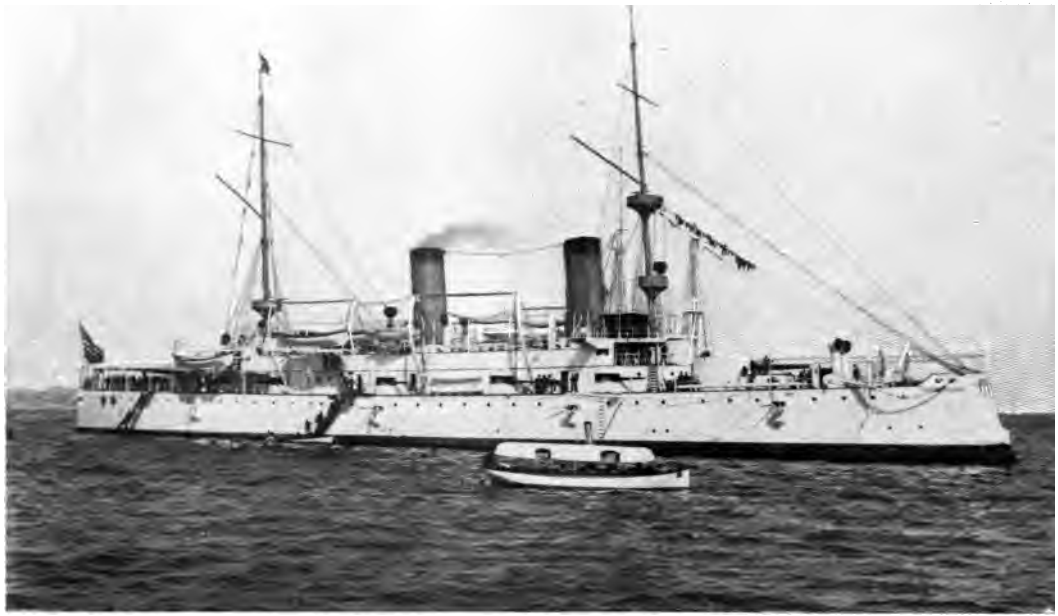
Those were long weeks for the big steel ships lying at sea seven miles off Key West, with steam up and rigidly observing night and day the outlook and precautions of war. Few of them were destined to have steam off their main engines or their guns unloaded at night for months to come; but that was not known then, and the uncertainty was trying. They saw preparations for war going forward all about them, but exactly what had been done or what would be done next by the authorities at home was a closed book to the men whose lives would be the first at stake when the time of preparation was over. Ships of war, regular and improvised, arrived day after day and reported to the flag; ammunition and supplies by the shipload were constantly arriving, and the air was full of stories and rumors. Finally when the order came to disfigure the beautiful white ships that all were so proud of by stripping them of external ornamentation, and covering their glistening sides with the dirty gray of the "war paint," it was felt that the end of the waiting was at hand and that the stern "last argument of kings" would soon be resorted to. It was a great relief when, on the evening of April 21, orders came to establish a blockade on the northern coast of Cuba, and the reaction from long suspense amounted to genuine joy from forecastle to cabin on board the waiting ships.

Before following the fortunes of the fleet that conducted the most extensive and decisive sea campaign in our history, we will turn to the Far East, where the first great event of the war took place. Like other nations having important commercial interests in the eastern countries of Asia, the United States has habitually maintained a squadron of war-vessels in that region. Our Asiatic squadron has never been large, and because of the character of service required on shallow coasts and rivers has been composed mainly of small vessels. At the beginning of the year 1898 this squadron, under the command of Commodore George Dewey, consisted of the protected cruisers Olympia (flagship), Boston, and Raleigh, the gunboats Helena and Petrel, and the old side-wheel double-ender Monocacy. The Helena had only just started from New York to join the squadron, and was recalled after getting as far as Lisbon in Portugal. The protected cruiser Baltimore from the Pacific station was shortly ordered to Asia to relieve the Olympia, and the gunboat Concord, also from the Pacific, went out early in the year to join the Asiatic squadron. The revenue cutter McCulloch, armed as a small gunboat, was also sent out to that station at about the same time.

By February 25 the state of affairs was such as to cause the navy department to send the following cablegram to Commodore Dewey: "Secret and confidential. Order the squadron, except Mono-

cacy, to Hong Kong. Keep full of coal. In the event of declaration of war Spain, your duty will be to see that the Spanish squadron does not leave the Asiatic coast, and then offensive operations in Philippine Islands. Keep Olympia until further orders." The Olympia, the Raleigh, and the Petrel were then at Hong Kong; the Baltimore at Honolulu, the Boston at Chemulpo, Corea, and the Concord at sea between Yokohama and Chemulpo. April 7, Dewey was cabled to "land all woodwork, stores, etc., it is not considered necessary to have for operations," and April 21 he was notified that "war may be declared at any moment." April 24 he received from Secretary Long the final cablegram: "War has commenced between the United States and Spain. Proceed at once to Philippine Islands. Commence operations at once, particularly against the Spanish fleet. You must capture vessels or destroy. Use utmost endeavors." The same day, at the request of the governor of Hong Kong, the Boston, the Concord, the Petrel, and the McCulloch left port, followed the next morning by the Olympia, the Baltimore, and the Raleigh.

These ships assembled in Mirs Bay on the mainland of China, thirty miles from Hong Kong, with which port they maintained communication by means of tugs and steam launches. April 27 they started on the voyage across the China Sea, six hundred miles, to the Philippines. Accompanying them were two supply-steamers that Commodore



E. H. Hart, Photo.

U. S. PROTECTED CRUISER OLYMPIA

29th of the month, but had returned to Manila because of his disgust at the failure to provide for the defense of the bay by placing guns and torpedoes previously ordered, and because he learned by cable from the Spanish consul at Hong Kong that Dewey would probably look for him at Subig. April 30 the Spanish admiral anchored his ships in line of battle across the mouth of Bacoor Bay, on the southeast side of Manila Bay, where the naval station of Cavité is located. At seven that evening he received a telegram from Subig that the enemy had been in that port and had proceeded toward Manila, and at midnight he knew by the sound of gunfire from the direction of Corregidor that the Americans would soon be upon him. No surprise was therefore in store for him, and none was probably intended, as there is a telegraph line from Cape Bolinao, where Dewey had shown himself early in the morning.

Coming on down the coast, Commodore Dewey's ships joined those already in Subig Bay about 5 P. M., and a council of the captains was held, to determine what to do in the absence of the Spaniards from that place. Then the united squadron continued its voyage to the southward, steaming slowly. Forty miles below Subig is the entrance, about six miles wide, of Manila Bay, the opening being divided into two channels by an island, Corregidor, one mile from the northern side of the entrance. The bay is so extensive that Corregidor

is about thirty miles from the city of Manila, situated on the eastern or inland shore of the bay. Steaming on past the northern entrance, Dewey, shortly after eleven o'clock at night, turned to the eastward and northward and proceeded into the larger opening, called Boca Grande, the width of which (about five miles) practically freed it from danger from torpedoes. There was a battery of heavy rifled guns on Corregidor and another on a small island, El Fraile, lying close to the southern side of the entrance.

The squadron was steaming in column, or line ahead, with no lights showing except one screened lantern over the stern of each ship as a guide to the one next following. The crews were called to quarters for battle when the ships headed in, as it was not supposed possible to steam past the batteries without discovery and action. Nevertheless, the six war-ships passed without a sign from the enemy, and it was not until the McCulloch came up abreast of Corregidor that rockets and signal flares gave notice that they had been seen. It is disputed whether the discovery was due to flames from soft coal blazing out from the smokepipe of the McCulloch or whether the leading ships had gone so far in that their stern lights became visible to the enemy. The battery at El Fraile fired a few shots that hit nothing, but were returned by the McCulloch and by the Boston and Concord next ahead of her. It was then a few minutes

after midnight of Sunday morning, May 1. The squadron continued on at low speed across the dark bay, the men remaining at the guns, but being allowed to lie down on deck and sleep if they could. The Olympia led, followed by the Baltimore, the Raleigh, the Petrel, the Concord, the Boston, the McCulloch, the Zafiro, and the Nanshan, in the order named. The three last were left in the middle of the bay and did not participate in the battle that ensued.

At daybreak the ships were off the city of Manila, three or four miles distant, and at 5.15 A.M. three batteries in or near the city began firing at them at too long range to have any effect. Two other batteries at Cavité and the line of Spanish ships lying thereby immediately took up the fire at harmless range, and as the Americans approached, two submarine mines are reported to have been exploded at least half a mile ahead of the foremost ship. This is denied by Spanish authority, which claims that no mines were planted in that part of the bay. The wasteful and premature firing of the batteries, without the incident of the mines, is a sufficient illustration of the thoughtless impetuosity of the Latin races that has brought disaster upon them and rendered personal courage futile in almost every instance where they have been pitted against more self-possessed and calculating men of colder blood. Steaming slowly onward, the Olympia led her little column of ships

to the southward and westward, taking a course about parallel to the Spanish line of battle, and at 5.41 A.M. her forward turret guns spoke the word that began the battle, when Dewey gave the quiet order to the captain of his flagship, "You may fire when you are ready, Gridley." The Spanish naval force consisted of ten vessels of war and one armed transport, besides which the two batteries at Cavité were so located as to form a prolongation of their line of ships.

After steaming along the Spanish line, giving and receiving a fierce cannonade, the American ships returned over nearly the same course, continuing the engagement and executing in the complete circuit a double loop something like an elongated figure 8. The distance from the Spanish line during this manœuvring varied from 5600 to 2000 yards, the distance at principal action being about 2500 yards. Two such circuits were completed and half of another, making five times that our squadron passed along the front of the Spaniards, when, at 7.35, the flagship signaled to cease action and withdrew the ships into the bay, where the crews were allowed to go to breakfast. Much has been made of this incident as an example of supreme confidence of success and of extraordinary consideration for the men, whose work both above and below decks had been of the most intense and exhausting character. Admiral Dewey reported that he went out of action because he had been

informed that there were left on the Olympia only fifteen rounds per gun for the 5-inch rapid-firing battery, and he wished a consultation and redistribution of ammunition if the latter should be found necessary. His position would have been critical if not fatal had he exhausted his ammunition in the presence of a hostile fleet at its own base of supplies while he was thousands of miles from a home port. At that time, it must be remembered, the Spanish ships gave very little visible evidence of the injuries they had sustained, and the American officers were greatly perplexed, after the tremendous firing on both sides, to see no apparent results. The hauling off of the American squadron gave the Spanish governor of Manila the temporary satisfaction of cabling home the news of a victory.

The report as to shortness of ammunition proved to be erroneous, and at 11.16 the action was resumed by the Baltimore being sent in to attack the ships and shore batteries, followed about twenty minutes later by the Olympia and others. By that time injuries to the ships of the enemy, not noticeable when the first action ceased, had shown themselves, and several of them were burning beyond control or sinking. The second action was therefore confined to silencing the Cavité batteries and the fire of the one Spanish ship that still had a crew on board to work a gun. By one o'clock the victory was complete, the white flag

was flying at Cavité, and the American squadron withdrew to an anchorage in the bay, leaving the Petrel to complete the destruction of some abandoned gunboats that had retired into shoal water inside Bacoor Bay. That little vessel had been so conspicuous in the day's work that she earned from the fleet the sobriquet of the "Baby Battleship." The next day the squadron returned to Cavité, and May 3 the Baltimore and the Raleigh captured and destroyed the battery on the island of Corregidor and paroled the garrison. The services rendered by this squadron later, in compelling the surrender of Manila, in conjunction with the army, were of great importance, but cannot be described in a work of this limited and general character.

The almost complete escape from injury of our ships in this remarkable battle is wholly beyond understanding, and can be attributed only to the hot-headed temperament of our antagonists, who seemed to fire in a frenzy of excitement, bent upon making much noise and smoke without consideration of results. Though in close action and subjected to an incessant and rapid fire for two hours, our ships came out of action as fit for battle as when they went in, and not a man was killed in the fleet. The Baltimore was struck five times and was the only American vessel that received injuries worth noticing. One of her 6-inch guns was put out of action by a small shell hitting its

recoil cylinder; the same shell exploded a box of 3-pounder ammunition, fragments from which slightly wounded two officers and six men, and these were the only personal casualties in the fleet. The Olympia was hit eight times, the Boston four times, the Raleigh and Petrel once each, and the Concord not at all; these hits were all from small projectiles or pieces of shells, and the damage they caused was insignificant.

The Spaniards lost their entire squadron, as follows: —

Sunk, — Reina Cristina, Castilia, Don Antonio de Ulloa.

Burnt, — Don Juan de Austria, Isla de Cuba, Isla de Luzón, General Lezo, Marques del Duero, El Correo, Velasco, and Isla de Mindanáo (transport).

Captured, — Manila (transport), Rapido and Hercules (tugs), and several small launches.

Of these vessels, the Don Juan de Austria, the Isla de Cuba, and the Isla de Luzón, small steel cruisers, were found not badly injured, the upper works only being burned, and have since been floated and repaired as vessels of the United States navy, thanks to the energy and ability of Naval Constructor Capps, who was sent out to Manila on that service.

Besides losing their ships, the Spanish suffered dreadfully in personnel. The flagship Reina Cristina at one stage of the battle came out from

the Spanish line with the seeming intention of engaging the Olympia at close quarters, but was driven back, sinking and on fire, and with such loss that Admiral Dewey reported that she had 150 killed, including her captain, and 90 wounded. The Spanish admiral reported his total loss, including those at the arsenal on shore, to be 381 men killed and wounded. The conclusion reached by him as to causes of the great disaster that befell him may be repeated in his own words: —

"It remains only to say that all the chiefs, officers, engineers, quartermasters, gunners, sailors, and soldiers rivaled one another in sustaining with honor the good name of the navy on this sad day.

"The inefficiency of the vessels which composed my little squadron, the lack of all classes of the personnel, especially master gunners and seamen gunners, the inaptitude of some of the provisional machinists, the scarcity of rapid-fire cannon, the strong crews of the enemy, and the unprotected character of the greater part of our vessels, all contributed to make more decided the sacrifice which we made for our country and to prevent the possibility of the horrors of the bombardment of the city of Manila, with the conviction that with the scarcity of our force against the superior enemy we were going to certain death, and could expect a loss of all our ships."

Commodore Dewey was appointed an acting rear admiral by the President on May 7, and three

days later a joint resolution of Congress tendered him the thanks of that body, which act carried with it his promotion to rear admiral. Nearly ten months later the rank of admiral was created by Congress, and Dewey was promoted to fill it. The captains of ships in the battle of Manila Bay were all advanced in official standing for "eminent and conspicuous conduct in battle."

The victory itself was so remote from the real theatre of war and affected such small fractions of the naval force of the contending powers that its direct influence upon the conduct of the war was not great. Indirectly, however, its influence upon subsequent events was important. It produced the greatest confidence on the part of the American people in their navy, and crystallized public opinion into enthusiastic support of the military branches of the government. It greatly strengthened the naval service by the high standard of excellence set before it, and produced an exactly opposite moral effect upon the enemy, who for the first time realized that their antagonist was dangerous. The extinction of Spanish naval power in the Far East had the important military result of relieving the United States from protecting its Pacific coast by sending ships there from other regions, and it was of great pecuniary benefit to the people of the western coast, as sea commerce could be pursued without hindrance and without exorbitant insurance rates. As an actual fact the

Spanish Asiatic fleet was unable to attempt a hostile movement across the Pacific Ocean, but that was known only to naval observers and was not believed by the general public.

We will now return to the American fleet in the West Indies and follow its principal operations through the long and perplexing campaign that culminated in the greatest sea victory known in our history. During the weeks of preparation after the destruction of the Maine, Rear Admiral Sicard continued in command and was unceasing in his efforts to get his ships ready for the coming struggle. March 26, his health having failed under the strain, the Navy Department was obliged to detach him, and he was succeeded temporarily, as the law provides, by the next officer in rank in the squadron, who happened to be Captain Wm. T. Sampson of the Iowa. April 21, with the dispatches from Washington directing the fleet to proceed against the Cuban coast, Sampson was formally ordered to the command of the naval force on the North Atlantic station, with the rank of rear admiral for the time being.

His flag as a rear admiral was hoisted on the New York at eight o'clock the next morning, as the ships were leaving Key West on their hostile mission, and was heartily cheered, especially by the crew of the Iowa. The appointment gave the utmost confidence and satisfaction to officers and men throughout the fleet, for the professional

reputation of Captain Sampson was of the highest order, and it was felt that he was preëminently the right man for the place. He had been chief of the Bureau of Ordnance in the Navy Department for four years shortly preceding the war, when the battleships now in his fleet were being built, and was beyond doubt the best-informed officer in the fleet as to their qualities and their offensive and defensive powers. He had also been for four years superintendent of the Naval Academy at Annapolis, the most important duty that an officer of the navy can exercise in time of peace, because he is then responsible for the training and spirit of the future officers of the navy.

The orders under which the commander-in-chief led his ships to war gave little opportunity for vigorous operations. They directed a blockade of the coast of Cuba from Cardenas, east of Havana, to Bahia Honda, west of that port, a coast extent of about 140 miles, and left the blockade of the seaport of Cienfuegos on the south coast optional. Bombardment was expressly forbidden in the orders sent to Sampson April 6 by the Navy Department. These orders stipulated that in the event of war the naval force of the United States in the West Indies must be used to capture or destroy Spanish war-vessels in those waters, but that the vessels of the United States must not be exposed to the fire of shore batteries at Havana, Santiago de Cuba, or other strongly fortified

ADMIRAL DEWEY

REAR ADMIRAL SAMPSON

have fixed the vicinity of Havana as the scene of action. There might then have been no San Juan blockhouse nor El Caney in our military history, and the men who fell at those places might yet be alive; but with the great multitude of Spanish troops in and around Havana we might have had a longer and more difficult campaign and a larger death roll to contemplate.

The fleet arrived off Havana shortly before sunset of the day it left Key West, and for the first time in the experience of nearly all its officers and men they looked upon an enemy's country. For the first time also they realized with personal interest that the combination of dark nights and sneaking torpedo-boats is contemplated with less equanimity in real war than in text-books on naval tactics. The ships, with all lights extinguished, dispersed along the coast and began the weary and monotonous blockade that was never relaxed until hostilities ceased. Uneventful as it was, it afforded the only duty that some of the smaller vessels saw during those hot summer months under the yellow sky where the Northern Star hangs low and the Southern Cross is seen. For the first week or so blockading was not without its excitement, for vessels with provisions and war-material for the enemy came in considerable numbers upon the coast, and had to be captured, often after an exciting chase that gave the firemen ample employment and streaked the sky for miles with long

ribbons of black smoke trailed astern from the funnels of pursuer and pursued. After a short time all flags but that of the United States practically disappeared from those waters, and the blockade became a long waiting and watching for contraband ships or ships from home with supplies and mail, the monotony being rarely broken by an arrival of either kind.

As more vessels were added to the fleet the blockade became more extended, until toward the close of the war it included nearly all the ports of any consequence on both the north and south coasts of Cuba and some in Puerto Rico. The character of this large and widespread fleet, which in July contained more than one hundred vessels under Admiral Sampson's command, was not calculated to inspire confidence in the mind of any one who had been led by Congressional oratory to believe that we could "lick all creation" on the ocean, though it sufficed for the particular emergency that called it into being. As at the time of the civil war, the government found itself with a wholly inadequate number of vessels of war for real hostilities, and was forced to buy or charter at exorbitant rates all sorts of steamers that could be hastily fitted with a few guns and hurried to the scene of activity. There were great ocean steamers, jaunty yachts, revenue cutters, lighthouse tenders, and ill-favored harbor tugs mixed in with the regular ships of war and trying to do

equal duty with them. A great battleship might relieve a tugboat on a blockade station, and a clumsy eight-knot monitor was expected, in theory at least, to chase a blockade-runner with the celerity of a twenty-knot cruiser.

As the campaign narrowed down to a prospect of a fight with a formidable squadron of the enemy, most of our large fighting-ships were taken off blockade duty and put in one or the other of the two squadrons that for some time were held in readiness for the encounter. This left the blockading lines almost entirely to small gunboats, yachts, and tugs, and in such extended order that each small vessel was almost wholly self-dependent. What the Spanish gun-vessels and torpedo-boats, of which there were about fifty in the many little rivers, bays, and inlets of the Cuban coast, were thinking of that they did not take the many opportunities that offered of falling upon these isolated little blockaders is more than one can imagine. A little enterprise and resolution would have made us much trouble and caused the erection of more than one memorial tablet in the chapel of the Naval Academy. But for some cause they left us almost entirely unmolested. The only notable instances of Spanish attacks upon the blockade were at San Juan in Puerto Rico, where the cruiser Isabel II. and the destroyer Terror went out to attack the huge but lightly armed liner St. Paul, and at Cienfuegos, where three gunboats assailed the yacht

Eagle. Both attacks were in daylight and both were easily discouraged with loss to the enemy.

April 27, a few days after the establishment of the blockade as above described, the first action of the war occurred. The flagship New York left the vicinity of Havana that morning and proceeded to the eastward on an inspection tour. Off Matanzas, fifty miles east of Havana, the monitor Puritan and the cruiser Cincinnati were found blockading the port, and the New York, after directing them to follow her, steamed into the harbor entrance to observe some new batteries that were seen to have been erected there. To ascertain their extent and the nature of their guns the New York opened fire, followed by the two other ships, which fire was at once returned by the new battery and by an older one on the other side of the harbor. Many shells struck near the American ships or passed over them, but none hit them. The action was sustained for twenty-nine minutes, when the ships withdrew, having accomplished their object, besides considerably damaging the enemy's earthworks. The New York fired one hundred and four shells, and the other ships in equal proportion to their batteries. Of course it was reported as a Spanish victory. It was merely a reconnoissance, and would not be mentioned but for the fact that it was the first actual clash of arms on land or sea in the Spanish-American war. Many newspaper boats at that time were permitted to tag the war-

vessels wherever they went, with the result in this case that when, a week or two later, newspapers arrived from home, the American naval officers were much surprised to learn that they had been engaged in a tremendous battle!

The Spanish Cape Verde squadron, or "disappearing" squadron as our sailors called it, left St. Vincent, Cape de Verde Islands, on the morning of April 29, and for nearly two weeks disappeared off the face of the ocean so far as any news of them was concerned, though they were steaming in frequented waters. The presence of boats with newspaper reporters on board before spoken of would have made any such secret movement impossible for the American ships. The Spanish squadron consisted of Admiral Cervera's flagship, the Infanta Maria Teresa, and the armored cruisers Vizcaya and Almirante Oquendo, these three being exactly alike and of 7000 tons displacement; the slightly smaller armored cruiser Cristóbal Colón, and the large torpedo-boat destroyers Furor, Pluton, and Terror. The destroyers had been but recently completed in England and had a record of about 30 knots speed; the armored cruisers had trial-trip records of about 20 knots. The three first named were built at Bilbao in the north of Spain, by an English engineering establishment there, and the Cristóbal Colón was built in Italy.

The possibilities for a squadron of such speed were great, and the definite news that it had left

St. Vincent and steamed into the west caused much uneasiness in the United States. It did not seem likely that Cervera would go to the West Indies and seek battle with Sampson's superior squadron, though he might go to that region and harass or break up the blockade, which his supposed superior speed would enable him to do, and avoid a general action. The danger most feared was that he might appear off the cities of the Atlantic coast and inflict great damage before a naval force could be assembled to attack him, repeating the onslaught from place to place and replenishing his coal and supplies from the property of his victims. As time went by without a word of the whereabouts or destination of the Spaniards the anxiety increased and there was much preparation and telegraphing. Swift cruisers like the Columbia and the Minneapolis, with many armed mail-steamers, were sent out as scouts to watch off the coast of New England and in the Atlantic about one hundred miles east of the easternmost line of the West Indies, and the "flying squadron" was held in readiness for immediate use at any threatened point on the coast. This latter was a small squadron collected some time before at Hampton Roads for home-defense purposes, and consisted principally of the battleships Massachusetts and Texas, withdrawn from Sampson's fleet for this purpose, and the armored cruiser Brooklyn.

Consideration of all the probabilities in the case led to the conclusion that the Spanish squadron would in all likelihood first appear at San Juan in the island of Puerto Rico, which was the nearest Spanish port in the West Indies, and where there was a navy-yard and coaling-station. From there, if allowed to coal unmolested, it would be free to proceed northward to attack the American coast or to try to avoid Sampson and annoy the blockade on the coast of Cuba. In view of the probabilities, it was decided to take a sufficient force from the blockade and proceed to Puerto Rico, so as to arrive there about the time the enemy would be due at their probable sea speed. The force selected for this expedition consisted of the flagship New York, the battleships Iowa and Indiana, the monitors Amphitrite and Terror, the small cruisers Detroit and Montgomery, and the torpedo-boat Porter. An armed tug, the Wompatuck, and the collier Niagara completed the squadron, which, because of the low speed of the monitors and the great difference in speed of its units, was a very ill-assorted group of ships to send against a fast and homogeneous squadron; but it was the best that we could do in our poverty in real ships-of-war, with the blockade to be maintained at the same time.

This force assembled by stealth, to avoid betrayal by the news-gatherers, about dark on the evening of May 4 in the vicinity of Cardenas, and proceeded to the eastward through the Nicholas Channel.

The unfitness of the two monitors for such an expedition was at once proved, as they could not keep up at the desired speed and had to be taken in tow by the New York and Iowa, which seriously reduced the speed of the squadron. No one knew better than Admiral Sampson that monitors were not fit for extended sea voyages when anything depended upon the voyage; but in the absence of anything more suitable he was compelled to take them along to get the use of their powerful turret guns. Besides the loss of actual speed caused by towing the monitors, much delay arose from the frequent breaking of hawsers with which they were towed, so that on May 8, instead of being off San Juan as originally expected, the fighting squadron was in the vicinity of Cape Haitien, Haiti. From there its location was reported by some of the enterprising newspaper people, and was known all over the world from the newspapers of the next morning. Had Cervera been at San Juan then, or even two or three days later, he would have had notice of the coming of the American squadron and had ample time to avoid it and fall upon the weakened blockade line far to the westward. It happened fortunately that he had been delayed in crossing the ocean by difficulty with machinery and was still at sea out of reach of telegraph lines.

Proceeding onward at its compulsory slow speed, the squadron arrived near San Juan, Puerto Rico, soon after midnight in the morning of May 12,

seeing in the distance through the night the reflection of the lights of the city in the sky. It was a thrilling and critical hour. All fully expected to find the Spanish fleet there and to be soon engaged in a great and decisive battle, the outcome of which no man could foresee because there was much doubt as to the real force of the enemy. It had been stated that other large Spanish ships beside those of the Cape Verde squadron were crossing the Atlantic, and among the many rumors brought off by the newspaper boats that had communicated at Cape Haitien was one to the effect that there were seventeen Spanish war-ships at San Juan. On the voyage eastward from Havana much serious work had been done on the ships to prepare them for a desperate encounter. On board the flagship New York the beautiful and expensive hard-wood paneling of cabins and officers' quarters had been ruthlessly chopped to pieces and thrown overboard to minimize the danger from fire; chain cables were wound around the ammunition-tubes, under turrets and elsewhere, and bags of coal and ashes were built into barricades in the wardroom and other places where men worked, to serve as partial protection against flying débris. Similar grim preparations were made on the other ships, and had their effect in impressing the crews with the seriousness of the enterprise. Officers and men were in a high-strung state of expectancy, and so eager to meet the enemy and have the suspense over,

even with our ill-assorted squadron, that it is a great pity the decisive battle could not have been fought that morning and the country spared the cost and loss of life incident to the later campaign of the army against Santiago de Cuba.

The admiral had prepared an order of battle several days before, which was printed and distributed to the officers that they might intelligently meet any emergency that might arise. This order, dated at sea, May 7, latitude 20.33 N., longitude 73.37 W., provided for both contingencies of finding the enemy in port and meeting him at sea, and is a model illustration of the exactness and forethought demanded of a trained naval commander in the exercise of the highest functions of his profession. It detailed the duty expected of each vessel in either condition that might be met, and left little to be done except to obey orders and win a victory.

On the evening of the 11th the admiral transferred his flag to the Iowa, believing that battleship better suited to lead in the expected fight than the lightly armored New York. All hands were called on the ships the next morning at three o'clock, and coffee, hard-tack, and cold corned beef provided for officers and men. Meanwhile the ships stole silently forward, slowly approaching their goal. With the first streaks of dawn, when objects could begin to be distinguished, it became reasonably certain that the Spanish ships were not in the harbor, nor could

any signs of them be discovered in the eastern sea where the sun was rising. To ascertain the strength and location of the shore batteries and to make absolutely sure regarding the presence of ships of the enemy in the inner harbor, the order of battle providing for finding the enemy in port was carried out and the fortifications were attacked. In this the admiral was justified, in spite of the orders not to hazard his ships against shore defenses so long as the Spanish fleet was at large. The risk of crippling the ships was not great, and under the circumstances the attack was in a manner an attack upon the ships of the enemy, which might very well be within hearing and would presumably hurry to the scene of action. The caution about attacking fortifications had been repeated to Sampson, May 5, by cablegram sent to Cape Haytien: "Do not risk so crippling your vessels against fortifications as to prevent from soon afterward successfully fighting the Spanish fleet, composed of Pelayo, Carlos V., Vizcaya, Oquendo, Colón, Teresa, and four torpedo-boat destroyers if they should appear on this side. — LONG."

The next day, May 6, Secretary Long had sent the following confidential letter to the admiral, which, however, was not received until after the affair at San Juan.

SIR, — Referring to the Department's confidential instructions of the 6th of April, 1898, and

to confidential order of April 21, 1898, modifying the above in so far as it concerns the blockade of Cuba, and to the Department's cipher despatches of April 21, 1898, and April 26, 1898, you are informed that the Department has not intended to restrict your operations in the West Indies, except in regard to the blockade of certain portions of Cuba and in the exposure of your vessels to the fire of heavy guns mounted on shore which are not protecting or assisting formidable Spanish ships.

The Department is perfectly willing that you should expose your ships to the heaviest guns of land batteries if, in your opinion, there are Spanish vessels of sufficient military importance protected by those guns to make an attack advisable, your chief aim being for the present the destruction of the enemy's principal vessels.

The Department writes this letter because it has been intimated by civilians, and it is believed by officers of rank serving under you, that you are not permitted to take the offensive even against small land batteries, and that you must wait to be fired upon before making an aggressive movement against any port, no matter how poorly fortified.

The Department does not think, however, that you have personally held this view; but in order to guard against any probable misconception on your part it has concluded to define more particularly its views as expressed above.

JOHN D. LONG, Secretary.

As soon as it was light enough to see well, the little Wompatuck advanced within range of the batteries to anchor a stake-boat for a turning-point for the big ships, as the order of battle required. It was a daring and perilous deed, which the onlookers expected to see ended by the brave little craft being blown out of the water; but not a gun was fired at her. Indeed, though it was now daylight, no flags were flying on the Morro, nor was there a sign of life on the shore. The Detroit steamed rapidly across the mouth of the harbor to take her appointed station to intercept any torpedo-boats that might try to come out, and still no movement on shore, though it was now five o'clock. The Iowa, the Indiana, the New York, the Amphitrite, and the Terror then advanced in column at about four knots speed toward the boat anchored by the Wompatuck. At 5.16 the Iowa broke the morning calm by firing a 6-pounder, an 8-inch, and then a 12-inch gun in succession, and this was followed by general firing from all her starboard battery and from those of the other ships as they came within good range. Then there was hurrying in hot haste on shore, manning batteries, hoisting flags, and, in a short time, firing, the first Spanish shot being fired eight minutes after the first gun from the Iowa. No vessels of any class appeared out of the harbor to participate in the battle.

It was a grand spectacle, though an incongruous

combination of the beautiful in nature with the destructive machinery of science. The white town with its background of great green hills on which the trees were waving in the wind made a peculiarly peaceful picture as it lay there in the gentle quiet of the tropical morning, but all this was suddenly changed by the rude voice of war. Clouds of sulphurous smoke shut out the white houses and green trees from the landscape, and the silence gave place to the shrieking of shells, the loud rapid reports of the smaller guns, and the thunderous discharges and echoes of the great guns of the battleships reverberating among the hills. As the blue sky became dimmed with cannon smoke, the variegated colors of the morning vanished, and the only brightness in the scene was the flash of guns and the lustre of our battle-flags, of which the writer retains a very vivid recollection, as they shone beautifully in the morning sun above the clouds of smoke that enveloped the ships that bore them. On shore also the red and gold of the Spanish ensign made many a bright spot amid the smoke and dust and the great fountain-like eruptions of crushed masonry and earth flying skyward where our big shells were striking.

Five ships of the attacking column steamed toward the town, firing at the Morro and at the other fortifications along the shore, until they had approached to within about 1500 yards; then they turned and steamed back, to pass again over the

firing line, using only the big guns in the latter part of the engagement because of the great quantity of smoke made by the smaller guns. After passing three times over the firing line and being in action two hours and twenty minutes, the ships ceased firing and drew out of range, except the Terror, which remained close in, engaging the batteries for an hour longer. The enemy, whose batteries were more numerous and provided with heavier guns than had been supposed, continued firing the whole time, and by so doing furnished a more prolonged and persistant resistance than they did in any other attack upon them during the war. The American squadron could have silenced the fire and forced the capitulation of the city during the day, but there were no troops to hold it, and as it had been proven that the Spanish ships were not in the harbor, there was no military object in continuing the attack: hence the withdrawal.

The firing of the Spaniards was miserable, particularly when our ships were closest, and consequently the easier targets. Shells struck in numbers all around the ships, and a great many passed high over them, as though all fired at the same long range regardless of the changing positions of the ships. They fell the closest at a point on the return course from the firing line, between four and five thousand yards from shore, and it has been surmised that the Spaniards had had a target planted at that point and were not accustomed to

firing their guns at any other range. This supposition is reasonable, judging from results, though it is difficult to imagine the patience of mind of a military genius who would thus train a gun and wait for an enemy to go to the proper place to be hit. Be this as it may, both the Iowa and the New York were struck at the location mentioned, the former while returning from her second trip over the firing line, and the latter while going out of action after the last round. The explosion of the shell on the Iowa wounded three men and did considerable damage to boats and upper works. On the New York the injury was more serious, as one man was killed instantly and four wounded, while a search-light and one boat were completely demolished, and a great many holes were made by flying fragments in boats, smokepipes, ventilators, and other standing objects on deck. From pieces of this shell it was identified as of fifteen centimetres diameter, or only about six inches, yet its explosive energy was such as to hurl vicious missiles over an area measured by at least one hundred feet of the ship's length. It was purely a random shot, and very peculiarly the man who was killed by it was named Widemark.

It was supposed on the New York at the time that this man was the first of the navy to lose his life in the war, but it was learned a few days later that this was not the case. The day before (May 11) a spirited engagement took place in the

harbor of Cardenas between the Wilmington, the Winslow, and the Hudson on the American side and some Spanish gunboats and shore batteries. In this the Winslow, a torpedo-boat, was temporarily disabled by a shell wrecking one of her engines, and had an officer — Ensign Worth Bagley — and four men killed. The same day, at Cienfuegos, on the opposite side of Cuba, two men of the Marblehead were killed in boats engaged close in shore, cutting cables under protection of the guns of the Marblehead and the Nashville. Both these affairs furnish examples of the greatest gallantry and heroism, and reflect much honor upon the personnel of the American navy.

When the attack at San Juan was concluded, the situation was more baffling than ever. The most probable plan of finding the Spanish fleet that could be devised had been carried out and had failed, leaving us more in the dark than ever as to its whereabouts. By all estimates of time and speed it should have arrived at San Juan before Sampson did, and now it seemed likely that it had been there and gone, or had passed to the westward too far from the course of the American ships to be discovered. This probability put the Havana blockade in danger a thousand miles away and made it imperative for the admiral to hasten back with his heaviest ships. The second morning after leaving San Juan, that is, May 14, the hospital-ship Solace was met and gave the remarkable

information that it was reliably reported in Key West, which port she had left on the 11th, that the Spanish fleet was at Cadiz in Spain! The mystery was now darker than ever and the cares of the admiral greatly multiplied, for he could not believe the report and yet had no absolute facts upon which to base doubt. The Porter was sent to a port in San Domingo to send a cablegram home asking about the truth of the rumor, and also requesting that a collier be sent to San Juan in case it proved to be true. This shows that the admiral intended to return and capture that port if it transpired that the Spanish fleet had really returned home.

Meanwhile, and for two days before, cable dispatches were flying thickly all over the West Indies and to and from the United States. The "disappearing squadron" had appeared on the American side of the Atlantic Ocean, but the admiral was fated not to know this for another day, when at midnight of the 15th the Porter brought out from Cape Haitien a quantity of dispatches, among them a positive one from Secretary Long that the Spaniards were at Curaçao, even giving the information that the Teresa and Vizcaya had entered that port for coal. Another dispatch of the same date from the secretary ordered Sampson to proceed to Key West at all possible speed. It transpired that at the very hour our ships were attacking San Juan an American officer at Fort

de France, in Martinique, saw with his own eyes the Spanish ships passing by to the westward. Instead of heading directly for their own island of Puerto Rico, the Spaniards had taken a more southerly route across the Atlantic and had passed through the chain of the Windward Islands at the French island of Martinique, about one hundred miles south of the latitude of Puerto Rico. The big auxiliary cruiser Harvard had put in at St. Pierre, Martinique, May 11, to cable a report of her scouting in that vicinity. That evening the American consul, Mr. Darte, received a private dispatch from Fort de France, fifteen miles distant in the same island, announcing that a Spanish torpedo-destroyer had arrived there at four that afternoon. This was confirmed almost immediately by the governor of the island sending official notice to Captain Cotton of the Harvard that the Spanish destroyer Furor had arrived at Fort de France and would depart about 7 P. M., and that in accordance with international usage the Harvard could not go to sea before 7 P. M. of the following day.

The marine officer of the Harvard, Lieutenant Kane, and the consul were sent by Captain Cotton to collect further news if possible. They made the trip in five hours in a small rowboat that night, arriving at Fort de France at two the next morning, May 12. There they found a Spanish hospital-ship, the Alicante, that had been there for some time, but no signs of any Spanish fight-

ing-ships. About seven in the morning they started on the return trip to St. Pierre in a small local steamer, and soon saw something that every American eye had been straining in imagination to see for the last two weeks. A squadron of large war-steamers, almost hull down, was passing in from the eastward, and any doubt as to its nationality was quickly removed by one vessel standing in to the harbor of Fort de France, passing so near the steamer upon which the Americans were that they counted her small guns and signal poles, and even noticed that her bottom was painted red. It was the Spanish torpedo-destroyer Terror, and the mystery of the disappearing squadron was at last dispelled. The important tidings were cabled at once by Mr. Darte to the State Department at Washington and by Captain Cotton to the Secretary of the Navy, and the fright that is said to have prevailed along our northern coasts was relieved.

Passing on from the offing of Fort de France, the Spanish ships proceeded on a southwesterly course in the Caribbean Sea. Spurred to energy, perhaps, by the knowledge that their whereabouts would now be known throughout the world, they steamed in the next twenty-four hours just one hundred miles more than had been made in any nautical day in the run since leaving the Cape Verde Islands. They arrived off the Dutch island of Curaçao, on the coast of Venezuela, May 14,

where the Teresa and the Vizcaya, and later the Pluton, entered the port. This news was cabled broadcast from Washington to every naval commander and consul in the West Indies, but, as before noted, did not reach Sampson until the 15th. Why Cervera took his squadron to neutral waters so far from the theatre of war instead of going to his most convenient and natural base in Puerto Rico is something that remains unexplained. He left Curaçao the evening of the 15th, which fact was of course at once reported by cable, with the disquieting addition, "Destination unknown."

Meanwhile, the flying squadron had been disturbed from its anchorage in Hampton Roads and sent to a sea rendezvous off Charleston, South Carolina, to await further orders. May 14 it was ordered to proceed with all possible dispatch to Key West, where it arrived the 18th. On the afternoon of the same day Admiral Sampson arrived at the same port in the New York, having preceded his other ships at higher speed to obey the orders of the department. The next morning the flying squadron left under orders to go off the port of Cienfuegos to look for Cervera there. The Iowa and the Marblehead were detailed by Sampson to strengthen the flying squadron, and some auxiliary vessels and colliers were also added to it. Up to this time and until a few days later this squadron was commanded by Commodore W. S. Schley, whose flagship was the Brooklyn, but on May 24

by order of the Navy Department the flying squadron was placed under the orders of Admiral Sampson and became a part of the fighting squadron, as the West India fleet was popularly called. The department had received information that the Spanish ships carried munitions of war absolutely necessary for the defense of Havana, and it therefore appeared certain that they would try to force an entrance to that port or seek another that had rail communication with it. The only feasible place on the south coast answering the latter requirement was Cienfuegos, and it was fully expected when the flying squadron left for that point that a general engagement would surely take place very soon.

It happened however that, at about the exact hour in the morning of May 19 when Schley's ships were steaming out of Key West the Spanish squadron was steaming into the narrow harbor mouth at Santiago de Cuba. The news of this arrival was immediately telegraphed to Captain-General Blanco at Havana, and at the same time, by agencies established by the army signal corps, was telegraphed through Havana to Colonel James Allen, the United States signal officer at Key West. That officer carried the message personally to the commandant of the Key West naval station, who repeated it to Washington. Allowing for locations of telegraph offices in Havana and Key West, it is probable that the commandant at

the latter place actually read the important news before it was known to General Blanco. Admiral Sampson, in the New York, coaling outside, was informed of the dispatch during the day, and the next morning it was printed by newspapers all over the world, with press confirmations from Paris and Madrid. Gifts from the Greeks were suspected by the ancients, and in this modern instance information of such vital importance coming from the camp of the enemy was naturally doubted, and not taken as conclusive.

The Spaniards had barely missed observation by responsible witnesses. The big steamer St. Louis and the tug-gunboat Wompatuck had been engaged in cable-cutting under the fire of the Morro batteries at Santiago on the 18th, and had left that position early in the morning of the 19th to undertake similar work at Guantanamo Bay, forty miles to the eastward. Had they delayed their departure only an hour they would have seen the approaching Spanish ships, which passed in at the entrance at 8 A. M. That would have been a valuable hour, for in the event it was exactly ten days before the Americans positively located their antagonists.

Although doubting the telegram from Santiago, the Secretary of the Navy telegraphed Sampson the same day that it "might very well be correct," and advised him to order the flying squadron from Cienfuegos to Santiago. Several of the big scouts

were ordered to reconnoitre Santiago, but they all reported within a few days that they had seen nothing of the enemy's ships. While in front of Santiago, May 25, the St. Paul captured the English steamer Restormal, bound in with a cargo of coal for Cervera. The log of this steamer showed that she had originally been ordered to meet the Spaniards at San Juan, Puerto Rico, thus confirming the accuracy of the belief that they would first attempt to make that port.

The flying squadron arrived off Cienfuegos, May 21, and remained there until the evening of the 24th, doubtful whether or not the Spaniards were in port. It then proceeded eastward at slow speed and arrived within twenty miles of Santiago forty-eight hours later, that is, in the evening of May 26. Two hours afterward, before any examination of the port had been made, the flagship Brooklyn signaled the squadron to proceed to Key West, and a start was made for that destination.

The authorities in Washington, naturally greatly exercised over the second disappearance of the Spanish squadron, became very anxious and perhaps provoked at what seemed lack of enterprise on the part of the flying squadron in seeking the enemy, and some of the dispatches sent to the commander of that squadron were almost reproachful. When the cablegram was received announcing that that squadron was on the way back to Key West there was genuine disappointment if

not consternation in Washington. The Secretary of the Navy immediately telegraphed the important news to Sampson and asked him how soon after the arrival of Schley he could reach Santiago with the New York and some other ships, and how long he could blockade there, the latter question having reference to the maintenance of a coal supply. To this the admiral replied that he could reach Santiago in three days, that he could blockade there indefinitely, and that he would like to start at once, as he did not see the necessity of waiting the return of the flying squadron, but proposed meeting it and turning back its principal ships. The same day, May 29, the department answered, authorizing him to proceed in person to Santiago at once.

For more than a week previous, Sampson had been on the north coast of Cuba, trying with the vessels at his hand to guard Havana from an approach by the enemy's squadron. As many ships as could be spared from the immediate vicinity were taken with the New York down the coast to the eastward, where for several days they cruised slowly back and forth in the Nicholas Channel, expecting to encounter the enemy there, bound around the east end of Cuba for Cardenas, Matanzas, or Havana. It was then thought impossible that Cervera would linger at Santiago, with a free exit before him, any longer than necessary to take coal. The American force now with Sampson was of such composition as to be fitly described by the word nonde-

script, and was daily changing, as ships went back and forth to keep the Havana position in strength. On one day about the middle of the week there were present, as shown by the author's notes, the flagship New York, one battleship, two monitors, four small cruisers of three different types, four gunboats of three types, one dynamite-gun vessel, two converted yachts, and two torpedo-boats. A precise order of battle was printed and distributed for use should the enemy appear.

Distracted with anxiety and disappointed at the reports received from the flying squadron, Sampson eventually went to Key West to communicate with his government, anchoring there with the New York the morning of May 28. There he found the Oregon, just arrived from her wonderful voyage from the Pacific, and fit for any service. There also he received the unwelcome information that the flying squadron had abandoned the vicinity of Santiago, and the telegram before mentioned asking if he could go to Santiago and maintain a blockade there. On the evening of the next day the New York, having filled up with coal, went to sea, and the next morning rejoined the patrol line in the neighborhood of Cardenas. Commodore Watson was left in command of the blockading force on the north coast of Cuba, and Sampson, with the New York, the Oregon, the Mayflower, and the Porter, started eastward at about thirteen knots speed. At dark that evening (May 30) they met two of the scouts

— Yale and St. Paul — and learned from them positively that the Spanish ships were in Santiago and that the flying squadron was still in that vicinity.

We will now return to the point where we left that squadron turning back toward Key West. It steamed slowly westward during the night of May 26 and the day of the 27th, being delayed by a breakdown of the machinery of the collier Merrimac, and by the circumstance that the Texas and Marblehead were alongside that collier, taking advantage of smooth weather to get coal. The delay gave ample time for reflection, and the westward movement was suspended. The next day, the 28th, the ships steamed back toward Santiago, near which place they arrived about dark and laid off and on until the next morning. They then steamed near enough to observe objects in the harbor, the first remarkable object that met the eye being the Cristóbal Colón lying at anchor in the channel less than a mile from its mouth. She was first seen by the Iowa, which signaled the discovery to the Brooklyn and prepared for the battle that Captain Evans supposed would surely take place. Two cruisers of the Vizcaya class and two torpedo-destroyers were soon made out, and all doubts as to the location of the disappearing squadron were at last removed. The scout St. Paul was sent at full speed for St. Nicholas Mole, Haiti, to cable the news home and to find and inform the commander-in-chief. The Spanish ships were not molested.

The next day, May 30, the squadron was strengthened by the arrival of the cruiser New Orleans. That ship had been dispatched by Sampson when in the Nicholas Channel with orders to Schley to remain on a blockade at Santiago at all hazards if the Spanish ships were there, and to obstruct the channel at its narrowest part by sinking a collier. This proposition was not a novel war measure. An order to the same effect had been sent direct from the Navy Department, and the Bureau of Navigation has since reported that it was suggested to the department by fully one hundred persons. The naval force now off Santiago was much stronger than the Spanish squadron, and consisted of the Brooklyn, the Iowa, the Massachusetts, the Texas, the New Orleans, the Marblehead, and the converted yacht Vixen. May 31, in the afternoon, the Massachusetts, the Iowa, and the New Orleans steamed in from their sea positions and crossed the harbor entrance twice at distances varying from five to six and one half miles, firing at the Cristóbal Colón. This reconnoissance was reported by the commodore, who was on the Massachusetts, as intended principally to injure or destroy the Colón, but the distance chosen was such that she was not hit and did no damage in return, recording in her log-book, "Our shot falling short on account of the enemy keeping at too great distance." The other Spanish ships and the batteries joined in the firing, but without effect. An exag-

gerated impression of the power of the guns in the shore batteries was obtained in this incident and reported to Admiral Sampson, who afterward experienced some harsh newspaper criticism, as though the error had been his own.

Early in the morning of June 1 the admiral, with the New York and the Oregon, arrived off Santiago, took personal command of his squadron, and immediately instituted a night and day blockade of the port that was not relaxed until its necessity had passed away. June 2 the admiral issued an order of battle assigning positions for his ships and directing among other things, "If the enemy tries to escape, the ships must close and engage as soon as possible, and endeavor to sink his vessels or force them to run ashore in the channel." This order remained standing and was the one under which the captains acted a month later when the battle was fought. The first plan of blockade was for the ships to lie in an irregular semicircle with a radius of about six miles from the Morro in the daytime, closing in to about four miles at night. The smaller ships lay closest in shore at the ends of this curve, the battleships occupying the centre in front of the harbor entrance. After the first bombardment, June 6, when it was found that the shore batteries were not so formidable as supposed, the blockading line was contracted to four miles in the daytime and closer at night. At the same time the arrangement was modified by sending in three

small vessels at night to lie within two miles of the Morro, with three steam launches as pickets a mile inside of them. These launches mounted a 1-pounder gun and carried several marines with rifles in addition to their regular crews. They were usually commanded by young naval cadets, who in those long dark nights experienced the most trying and dangerous service that the war afforded. They seemed to like it, and were so little impressed with the perils of their duty that it is an item of unofficial history that one of these youths one night landed near the Morro to go in swimming, for which recreation he underwent a period of suspension from duty, prescribed by his commanding officer.

Beginning June 8, the battleships were sent close in from dark until daylight, alternating in directing a brilliant search-light directly up the harbor entrance. This was the most important element in making the blockade successful, as Spanish officers afterward admitted that a sortie at night was absolutely impossible because of the blinding glare of light that a ship trying to steer her way out of the channel had to face. At the same time the channel was so illuminated from our point of view that detection and attack in case of an attempted escape were as easy as in daylight. This was proved when the enemy tried one night about midnight to sink the Reina Mercedes to block the channel, which ship was promptly sunk by the gunfire of the Texas and the Massachusetts,

then on guard, before she could go the few hundred yards to the desired position. Close by the search-light ship there was always another battleship, totally dark, and with her guns, in the expressive idiom of the frontier, "loaded for bear," and ready to open fire the moment a suspicious movement was observed inside.

When the admiral arrived off Santiago he found that nothing had been done toward sinking a collier in the channel. He accordingly had it announced in the fleet that volunteers for such an enterprise would be accepted, and the response was more than gratifying, as hundreds of officers and men hastened to send in their names. The collier Merrimac was selected, and the work of removing valuable stores and furniture from her and preparing her for self-destruction was at once begun under the supervision of Assistant Naval Constructor R. P. Hobson, of the New York. The original order had named the Sterling as the vessel to be sacrificed, but the Merrimac was finally selected as a larger ship, and with the mass of 2500 tons of coal in her hold was better calculated to form an effectual obstruction to navigation. The selection of Mr. Hobson to command the expedition was somewhat irregular, as he was a staff officer and not eligible under the law to exercise military command. He had, however, worked out a chain of details by which the sudden sinking of the ship was to be effected, and

from being thoroughly familiar with them was naturally the best qualified to execute them. There was no time for him to teach some other officer, who might lawfully command, and, as always happens in strong emergencies, theories of law had to be interpreted to suit actual requirements.

A large force of men from the New York worked all the afternoon of June 1, and nearly all night stripping the Merrimac and preparing her for destruction. The admiral went on board about three in the morning, and after an inspection of the various provisions by which sinking was to be effected he bade Hobson good-by and authorized him to go in. The ship was barely ready, and in the delay of completion and in getting the working parties off it began to grow light. Determined to settle the affair then and there, Hobson started in, but it was then so light that his approach would surely be discovered long before he could gain the channel, and the admiral sent the Porter to call him back. Hobson was not over-pleased at the order, but the delay gave him all of that day in which to perfect his details, and enabled him to go in finally as completely prepared as forethought and opportunity could make him. The hours of the next night were long ones to the watchers in the fleet, and must have seemed longer to Hobson and his men on the dark and silent hulk lying near the flagship. As finally arranged, a pilot and several men in addition to the volun-

teer crew were to stay on board to work the fires and do other necessary work until close to the harbor entrance, when they were to be taken off by boats from the New York and the Texas. The crew selected from all the volunteers numbered but seven men, — three of the regular crew of the Merrimac, three from the New York, and one from the Iowa.

The sky was overcast and black. About three in the morning, June 3, the Merrimac moved slowly away from the flagship and vanished in the darkness, a steam launch from the New York commanded by Cadet Powell following her to rescue survivors, who, according to Hobson's plan, hoped to come out of the harbor in a row-boat after the sinking. There was a seemingly interminable wait while hundreds in the fleet with hushed voices and straining eyes faced the black silence in the direction of the Morro. The suspense was at last broken by the flash and subsequent report of a gun; then another and another, until in a few seconds the steep hillsides on both sides of the channel were literally blazing with gunfire and rattling with its echoes. It was learned later that some hundreds of riflemen were posted on these slopes at night, and batteries of small rapid-fire guns were concealed among the bushes waiting for just such an emergency. The lurid popular accounts of this event describe the heavy guns of the Morro and of the Socapa battery opposite as ploughing the Mer-

rimac with their shells, but their location so close to the channel and so high above it made it impossible for them to hit her, even if they fired at all, which is extremely doubtful. The Reina Mercedes, lying in the side channel between Cay Smith and Socapa, did fire at her, as did the Pluton from the little bay opposite. Each of these vessels fired two torpedoes at her, but apparently without result, and two of the torpedoes were found floating at sea the next morning. One of these was harmless, having the exercise or drill head on it instead of the war head by which it could be exploded, which shows that the enemy was at least excited.

The firing lasted for a considerable time, perhaps fifteen minutes, when it gradually ceased and all was darkness again and silence. As day broke and the sun came up, about ten feet of the Merrimac's smokepipe and her two masts were distinguished sticking out of the water a long distance up the channel beyond where it was desired to sink her. There were no unusual signs of activity on the part of the enemy and no vestige of the New York's steam launch. An hour or so later that boat was observed to the westward of the entrance close in shore, where she had been searching for the Merrimac's men. She soon returned to the ship, and Mr. Powell reported that no one came back after the ship went down. It did not seem possible that any man could survive what the Mer-

rimac had been seen to go through, and the general belief then was that all the gallant little crew had perished. About the middle of the afternoon a Spanish tug flying a flag of truce came outside and the Vixen was sent to meet her. When the Vixen's boat went alongside the on-lookers imagined they could see ominous-looking long boxes being put into the boat, and the worst fears of the day seemed realized, for the enemy could have no purpose in communicating with us except to return our dead. The very opposite proved to be the case. A gray Spanish captain, courtly and dignified, came on board from Admiral Cervera to say that Hobson and his men were safe and prisoners of war in the Morro, and that the unusual heroism of their exploit had so moved their captors that the admiral deemed it proper for their friends to know of their safety. It was an extraordinary message, and besides turning apprehensions into rejoicing it gave the Americans a peculiar sensation, as though they had seen the pages of the centuries turned backward to the days when Spanish chivalry had been the example of the world.

To return briefly to Hobson and the Merrimac. The carefully laid plans of anchoring the ship at the narrowest part of the channel and sinking her as she swung across with the tide by opening her valves and exploding improvised torpedoes strung along her sides, failed through no fault of preparation. The shots fired at her in the darkness

seemed to find the most unfortunate landings, and in a very brief time the string of torpedoes was broken, the anchor chains shot away, and the ship itself out of control because of damage to the rudder. So she went on into the blazing hell quite unable to help herself or even to sink herself. Some of the first observation mines were passed without injury, but by that time the operators were alert and a mine was exploded so close as to lift her partly out of the water and to do damage that, in conjunction with the opened sea connections, caused her to sink soon after, half a mile further in than was intended and at a place where she offered little or no difficulty to navigation.

The subsequent rescue of Hobson and his companions from the water by the Spanish admiral himself, the kindness of the Spaniards to them, their imprisonment in the Morro and subsequently at Santiago, and their eventual exchange and return to duty are all details of the most romantic and heroic episode of the war, too well known to require repeating. Hobson failed in his object of blocking the channel, through no fault of his own; but in failing, he set an example of self-devotion and patriotism that has not many parallels in all the history of warfare. Those who were privileged to witness his exploit had an ideal of youth revived, and the long-forgotten school-book stories of Horatio on the bridge and Leonidas in the pass of Thermopylæ came vividly into mind, as

they must have come back to the thousands who have since read the story of the Merrimac.

Some unfavorable newspaper comment, born of crass ignorance, has been directed at Admiral Sampson because he did not steam boldly into Santiago harbor immediately upon his arrival there, "as Dewey did at Manila." There is no possible comparison between the two places. The Boca Grande, by which Dewey went into Manila Bay, is, as previously described, about five miles wide, correspondingly deep, and the channel of rapid tidal currents. Its defense by submarine mines would be almost impossible and an undertaking so great that no country would dream of attempting it unless possessed of unlimited time, and enormous wealth to sink in the sea. Spain had neither of these requisites when the war came, and danger from torpedoes at the approach to Manila Bay was probably not thought of any more than such a danger would have been feared in the middle of the China Sea. The entrance to Santiago Bay, on the other hand, is not wider than the length of the New York, and, with the buoys and range marks removed, would have offered a serious problem in navigation without any defenses. The ship channel is so narrow that instead of requiring acres or square miles of mines, one mine in a place distributed along the channel is all that is required for complete obstruction.

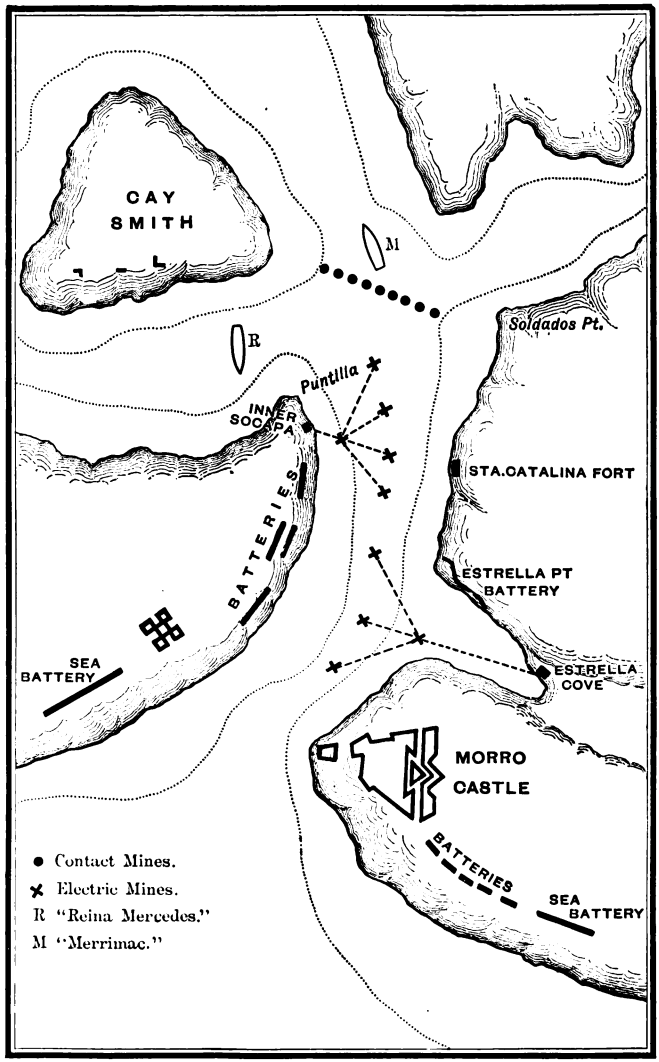
A few minutes after the formal surrender of

Santiago, Lieutenant Capehart of the New York, a torpedo expert, was at work removing the mines, in which delicate task he was voluntarily assisted by the Spanish naval officer who had planted them. The location and arrangement was found to be as shown by the chart inserted here. The electric or observation mines, each containing 226 kilos, or nearly 500 pounds, of gun-cotton, were arranged to be exploded by electrical contact from hidden stations on shore, where there were suitable instruments mounted for observing the exact position of a passing vessel and determining when it was over any particular mine. A row of contact mines, that is, torpedoes that explode when a ship runs against them, was planted across the channel at the line indicated just below the Merrimac. That part of the channel east of the Merrimac was closed by log booms, the logs secured together by 5-inch steel hawsers, and a similar boom extended from Smith Cay to the mainland as a protection for the Mercedes. A very vivid illustration of the effect of a submarine mine upon a ship existed in the minds of all present in the example of the Maine. Some of the contact mines were taken up to let the Spanish ships go out later, and the firing arrangements for the electric mines were disconnected on shore, all being replaced when the ships had passed. With this brief description of the defenses and the chart showing the position of the mines, it is not necessary to speculate as to the

result of an attempt to force the passage or to explain why any officer of sound mind did not try it.

After the affair of the Merrimac came a month of rigorous blockade duty that demanded the full energy and attention of every officer and man on the encircling ships. The scenery became very familiar, and some may have grown weary of looking always at the great mediæval castle on the crag at the harbor mouth and the iron hills beyond, but there was little complaining, as all realized that a great object was in view, and that patience would bring a successful ending. Those were not days of pleasure; the keeping of watches and drilling, taking coal almost by the handful out of colliers in the rolling sea, and the frequent calls to arms night and day, furnished employment that seemed never to have a resting period. Fresh fruit and vegetables were almost unknown to those crews all summer long, and the canned substitutes sometimes failed to please. Even as humble and common an article as the potato acquires unsuspected virtue when it becomes a stranger for a number of weeks.

The much discussed canned roast beef that made so much trouble in the army was the staple diet of officers and men of the navy, who apparently did not know any better than to like it. It must be said, however, that there are ample facilities for preparing it in various ways for the table on board ship, and that canned foods stored far



ENTRANCE OF SANTIAGO HARBOR

actions along the coast, in which one or more vessels took part, and which served like the others to keep the crews in fine war spirit and prevented anything like dullness from growing upon the life afloat. The most important of the minor actions was the seizure of Guantanamo Bay by a battalion of marines, supported by the Texas and two or three smaller vessels. This was important not merely as a successful fight, but because it gave the American squadron a quiet and safe harbor in which to coal, take stores, and make repairs. As mournfully reported by the Spanish commander at Guantanamo, "The American squadron, in possession of the outer bay, has taken it as if for a harbor of rest; they have anchored as if in one of their own ports since the 7th, the day they cut the cables."

The most spectacular bombardment of the month was that of June 22, the day that the army began landing. This force, the 5th Army Corps, commanded by Major General Shafter, arrived in thirty-two transports, convoyed by fifteen naval vessels, on the morning of June 20, and presented a really stirring sight as the eastern horizon became literally black with masts and smokepipes. The flagship of the convoying force was the battleship Indiana, which joined the blockading squadron and became an important actor in subsequent events. Naval vessels, mostly small ones that had come with the convoy, were stationed along the coast for

about sixteen miles, from Cabanas west of the harbor mouth to Daiquiri east of it, and on the morning of the 22d began firing to dislodge the enemy from the many blockhouses and rifle-pits he had all along the coast. The spectacle of so many ships firing along such an extended line, combined with the activity of scores of small boats landing troops from the swarm of transports at Daiquiri, made a thrilling sight long to be remembered. The only damage sustained by the navy that day was from a shell from the western, or Socapa, battery at the harbor entrance, which struck the Texas and killed one of her men, besides wounding eight.

All the large ships of Sampson's fleet contributed their boats and steam launches to aid in the landing, and the greater part of the troops landed were put on shore by the navy. The transports furnished some boats, and probably in time could have landed all the men without naval aid, though they were without steam launches, which were of immense value in towing numbers of loaded boats at a single trip. By nightfall six thousand men were on shore, which was heralded by some of the newspaper men as a great and unequaled achievement, neglectful of the fact that more than fifty years before double that number of American troops were landed, with naval assistance, in six hours, near Vera Cruz in Mexico. After landing, two regiments under General Lawton moved along the coast westward, and the next morning took pos-

session of the Ensenada de los Altares (Siboney), where troops were landed the same day as well as at Daiquiri. All the troops, with animals, field guns, and other paraphernalia, were not on shore until the evening of the 26th. Altogether, including 3500 Cubans brought in our transports from west of Santiago, about 20,000 men were landed in the enemy's country. General Lawton reported that at Siboney he found nearly one hundred railway cars loaded with steam-coal. At Santiago the day of the surrender the author saw considerable quantities of coal in piles near the Juragua Iron Company's pier; from which facts it seems that lack of coal did not prevent the Spanish ships from leaving Santiago during the twelve days in which the sea was free to them after their arrival.

The orders to General Shafter, dated May 31, directing him to take a military force into Cuba, mentioned the seizure of the enemy's positions at the entrance of Santiago harbor, in order that the navy might take up the mines and enter, as a definite object of the expedition. After the first bombardment of the harbor forts, June 6, when Sampson found that the batteries alone could not keep the ships out, he telegraphed home that if ten thousand troops were there the Spanish fleet and city could be taken in forty-eight hours. In the light of after events it looks as if the admiral overestimated if anything the number of men required, for the garrisons in the Morro and adjoin-

ing forts were found to be very small, and probably half the number of men mentioned could have held the position against any men that could have come from Santiago long enough to permit of taking up the mines. The day the army arrived, there was a conference between Admiral Sampson and Generals Shafter and Garcia, at which it was agreed that the capture of the harbor forts was the first object in view. Indeed, it was the only object, and the reason why troops had been sent to that part of Cuba. The capture or destruction of Cervera's fleet, not the possession of the remote city of Santiago, was the wish of the government. Nevertheless, when the army was once landed it proceeded inland on a totally different campaign, and did not move against the harbor forts at all.

July 1, the New York, the Gloucester, and the Suwanee went close in at Aguadores, three miles east of the Morro, and for several hours shelled some rifle-pits and an old fort there, supporting an attack by the Michigan brigade. This was supposed at the time to be the beginning of a movement to take the Morro and batteries, but the soldiers withdrew about the time when they seemed to have won a victory, as there were no more signs of Spaniards; and it was afterwards reported that the day's proceeding was merely a feint to distract attention from a more serious attack in the direction of Santiago. At five the next morning the New York, the Oregon, the Indiana, the Iowa, the

Massachusetts and the Texas attacked the harbor batteries, and for nearly three hours the fiercest bombardment of the war ensued, the ships during the engagement going almost inside the entrance and firing at the Punta Gorda battery beyond the wreck of the Merrimac. On this occasion the big flag that had flown so bravely from the Morro ever since the blockade began was shot away.

The next day, July 3, was Sunday, and began like other mornings without sign of any great coming event. The Massachusetts had been on the search-light position all night, but left at dawn to go to Guantanamo to spend the day coaling and return in time to resume her blockade duty at dark. The other ships then present were lying in the usual day position on a rough semicircle with a radius of a little more than three miles from the Morro, the Indiana being closer inshore and considerably less than that distance. Counting from the eastward, they were Indiana, New York, Oregon, Iowa, Texas, and Brooklyn. Fully a mile almost directly north of the Indiana, close inshore and not more than one and one-half miles from the Morro, was the armed yacht Gloucester, and another similar yacht, the Vixen, lay a mile west of the Brooklyn and about half a mile nearer shore. The auxiliary cruiser Resolute, with a large quantity of high explosives on board that were intended for use in countermining the channel, was close to the Indiana. The Texas and the Iowa were

most directly in front of the channel and commanded the best view inside.

At 8.50 the New York drew out of the line and started for Siboney to land the admiral and his staff for a conference with General Shafter, who was very desirous that the navy should force the harbor at all cost. Disquieting reports from the army had reached the flagship the evening before, one so serious as to indicate a possible retreat unless relieved from resistance in front by the presence of the American fleet in the harbor. The New York was accompanied by the torpedo-boat Ericsson and the yacht Hist, the commander of the latter, Lieutenant Young, being on board the flagship reporting an engagement at Manzanillo. The report of Captain Evans of the Iowa gives 9.31 as the time that the lookout on the bridge of that ship, while regarding a suspicious column of smoke beyond the headlands inside the entrance, saw the big black bow of a Spanish cruiser suddenly push into view. The Iowa instantly fired a 6-pounder gun to attract attention, and hoisted the signal, "Enemy's ships coming out." At practically the same instant the same discovery and signal was made by the Texas, sharing with the Iowa the best position for observation. As there were watchers on every ship whose business for a month had been to scan that narrow harbor gap, it is not strange that almost every vessel has claimed the discovery as original. As the first

Spanish ship came on it was seen that she was followed closely by another, and that by a third, all with their battle-flags unfurled, and it was known that the long-hoped-for hour had come. Almost simultaneously with the discovery of the Spaniards the batteries on shore began firing at the American ships with their customary lack of precision, and the Spanish ships opened fire as they came into range soon after.

There was a slight pause — possibly five minutes — before any American ship fired, which was due partly to the fact that the crews of all the ships were standing at quarters for Sunday inspection, and partly because the position of some of the ships prevented them from seeing the enemy until he was almost outside the channel. The admiral's order of battle of a month before was carried out literally by all the ships immediately starting their engines ahead at full speed and closing in toward the harbor to engage the enemy. The only departure from the prescribed plan of action was on the part of the Brooklyn. That vessel, after steaming about half a mile toward the enemy, suddenly turned away in a circle that brought her eventually on a parallel course with that taken by the Spaniards (whose column was now well outside and headed westward) but about half a mile farther out than the other American ships.

Different reasons have been advanced in expla-

nation of this manœuvre, but they do not appear to have satisfied the public, if one may judge by the wide-spread discussions that have resulted. Had the Brooklyn turned the other and more natural way to acquire a parallel course with the Spaniards, it would have brought her closer to them than our other ships were; but as she was then, according to the report of the navigators, a mile further west than any other American ship and was of much higher speed than any of them, the fear of her "blanketing" their fire by interposing between them and the enemy does not seem to be well founded. Some results of the manœuvre were disadvantageous: while running back after turning around, she crossed the path of the oncoming Texas so close that that vessel had to stop and back her engines to avoid collision, thereby losing position and increasing her distance from the flying enemy; the Brooklyn's own position gained by the turn was a loss of advantage, as the increased distance of course decreased the accuracy of her gun fire. The latter, however, was excellent as it was, and contributed so much to the general result that any error committed earlier in the action was redeemed. The ship does not deserve the slighting comparison that has been made, likening her conduct to that of her predecessor in the navy, the older Brooklyn, which is on official record as having faltered at the Vicksburg batteries and at Mobile Bay.

The little Vixen saw that she was nearly in the course of the enemy and very properly fled from that dangerous region, standing straight out to sea until well outside the American line, when she steamed parallel with it, firing her small guns frequently when within range. The New York was four miles east of her blockading station and seven miles from the Morro when the signal gun of the Iowa rang out its warning. She turned sharply about and steamed at full speed back to where the battle was soon to begin, but as the Spaniards turned westward the fight became a running one, moving rapidly in that direction, and the New York never got within effective range of the big cruisers, her part in the actual fighting being limited to firing a few times at the torpedo-destroyers and to receiving for some time the undivided fire from the forts at the harbor mouth as she sped past them. In former years seven miles would have been sufficient to have completely separated a ship from an engagement, but with modern ordnance distances are greatly reduced. Those who assert that the New York was entirely out of the Santiago sea-fight seem to forget that her distance from the enemy's vessels was but little if any greater than that selected a month before by the ships of the flying squadron that attacked the Cristóbal Colón when she was lying at the mouth of the harbor.

It was a sore disappointment to the crew of

the New York that she was not the central figure in this event, as she had been in all others of importance during the campaign, but in the light of results it is better that the affair came off just as it did. Had the New York been at her usual station, her great size and the admiral's flag that she wore would have attracted the whole Spanish fire; and, bad as their gunnery was, they could hardly have failed to do her some injury and kill some of her people. As it was, the Spanish fleet was annihilated with a loss to us of only one man.

Though debarred from an active part in the fighting, the flagship directed the operations of the day to a considerable extent. She sent the Indiana and the Iowa back from a point about fifteen miles west of the harbor to resume the blockade, and she dispatched the small vessels — Gloucester, Hist, and Ericsson — to go to the rescue of the crews of the stranded Spanish ships. The reëstablishment of the blockade was a vital point, as there were armed Spanish vessels still in the harbor that might have escaped or attacked the fleet of transports near Daiquiri. The superior speed of the New York enabled her to gain several miles on all the other vessels during the chase and to arrive at the final scene very little later than the ships more fortunate in position at the beginning of the battle.

As an offset to the chagrin of being out of the

thickest of the fight, that part of the crew of the New York that was not engaged in shoveling coal into her forty-eight hungry furnaces had an exceptional opportunity of viewing the combat, which was spread out before them like a tragedy on the stage. It was a glorious sight. The Spanish ships came out at good speed in close column in a great cloud of their own smoke that rose as high as the Morro and presented an unnatural mixture of white and black as the cannon smoke wreathed around that from the furnaces. As they turned westward clear of the channel, their speed increased to the full power of their engines, and they drew rapidly ahead of our ships, that had much the advantage of position at the start. In turning, their broadsides were presented toward the Indiana, and that ship seemed to receive the greater part of their fire at first, as our other ships were more nearly ahead of them and at a considerably greater distance. The Indiana blazed like a volcano in reply, and must have done them much injury at the very beginning of the battle. Indeed, the pilot who took out the leading ship, the Teresa, said that when the helm was shifted to turn westward there were already many killed and wounded in the battery, and he believed the ship was already on fire. Our other ships of course were firing furiously at the same time. The enemy came out in the order Infanta Maria Teresa (flagship), Vizcaya, Cristóbal Colón, Almirante

Oquendo, and the destroyers Pluton and Furor. The destroyers were roughly used by the battleships nearest the harbor, and were finished by the plucky little Gloucester, which closed in with them both and within a very short time had to rescue their survivors.

The speed of the armored cruisers, though high for a few minutes, never reached what they were capable of, and very soon began to drop. With the exception of the Colón, which was inside the others and shielded by them, they were all being terribly battered by the big American ships, and the destruction on deck that soon caused a marked diminution of their gun-fire probably had its effect below and took the nerve from their firemen. Within fifteen minutes the Teresa and the Oquendo were burning from the effect of our shells, and for some reason did not put the fires out, though they were found well equipped with fire-extinguishing apparatus. Much less than an hour after they came out, they were both on shore about seven miles from the harbor, burning beyond control, with their crews struggling to escape over the bows to the shore. The Vizcaya continued the unequal contest for nearly an hour longer, hopelessly fighting the Oregon, the Iowa, the Brooklyn, and the Texas, when she too, also on fire, turned and ran ashore. The explosion of one of her magazines later was the most terrific incident of the day.

Of the formidable squadron of less than two

hours before, the Cristóbal Colón alone remained, and she was so far ahead at this stage of the battle that her chance of escape seemed excellent. The Iowa and the Indiana were withdrawn from the battle by the flagship about the time the Vizcaya went ashore, and the Brooklyn, the Oregon, and the Texas, with the New York much farther behind, continued the pursuit. The Oregon, from being next to the easternmost ship when the alarm sounded, had passed rapidly ahead of the other battleships by a remarkable burst of speed, and was now almost abreast of the Brooklyn, which position she maintained to the end, using her forced draft and exceeding at times her contract trial speed. The chase continued for about two hours, the initial speed of seventeen knots of the Colón gradually diminishing and the pursuers visibly gaining. Ten minutes before 1 P. M. the Oregon began firing her forward 13-inch turret guns, throwing shells near and over the chase, and the Brooklyn fired some smaller guns soon after. At a quarter after one the Colón turned in toward the beach, ran ashore, fired a gun to leeward, and hauled down her flag. Thus tamely did the decisive battle of the war end, after it had begun with such fury and desperate valor.

"To Castile and León a new world gave Colón," was written on the tomb of the great Admiral of the Indies. Worse is it than the cruelty of fate that, nearly four centuries afterward, the fluttering

down of the ensign emblazoned with the armorial bearings of Castile and León from the peak of the noble ship that bore the admiral's name should be the signal for the passing away of their last vestige of power in that new world. But so it was; the bright ensign of Spain lay for hours that fatal afternoon on the quarterdeck of the Cristóbal Colón, and at least one who saw it reflected with sorrow that in glorifying the arms of the leading nation of the new world it had been the decree of fate that the name of its discoverer, revered by its inhabitants, should be dragged to dishonor.

The Colón was found almost uninjured, and looked, as the victors closed around her, like a perfect and beautiful ship at anchor. Only six hits, all by small projectiles, are reported in her case, and she had only one man killed. She gave up the contest without showing either the speed or the fighting power that was in her, and her conduct is the only blot on a day that but for this contained a full measure of honor and glory for the vanquished. After running ashore her sea connections were opened and the ship allowed to fill slowly with water. This has been stigmatized as a dishonorable act, and so it was if it was committed after the flag was hauled down, for with that token of surrender the ship passed from the authority of the enemy, and was not theirs to destroy. Otherwise, it was the duty of her commander, as in our own and all naval services, to

sink or destroy his ship to keep it out of the hands of an enemy. As the Colón settled deeper in the water there was some haste to get her crew disembarked and to get our own prize crew out of her. It was then after dark, and the white search-lights shining on the doomed ship and flitting figures about her decks made a weird and uncanny spectacle. She lay at the foot of a great mountain rising 8000 feet abruptly from the edge of the sea and apparently extending as far below its surface, as the bottom deepens with startling rapidity off shore. Hawsers were led ashore from the Colón, and in a final effort to save her the big New York steamed up against her and shoved her bodily on the beach with her ram. But all efforts failed; about eleven o'clock that night, with the flag of the United States flying at the staff on the stern, she rolled half over on the shelving beach and sank almost out of sight.

The Spanish loss this day was reported by Admiral Cervera as six hundred men killed and wounded, but probably this was an overestimate, since a number of survivors from the stranded ships are known to have straggled back to Santiago and to have been surrendered later. About seventeen hundred prisoners, many of them wounded, were on board the American ships at the close of the day. Admiral Cervera and nearly one hundred officers were prisoners. The Spanish ships were thoroughly examined as soon after the

battle as they could be boarded, and were found terribly riddled, especially by small projectiles from 6-pounder and 3-pounder rapid-firing guns. The engines were found intact, showing mechanical inaptitude instead of injury as the reason for their failure in speed. From the circumstance that guns on the engaged side were found loaded on each ship, it seems probable that something in the nature of a panic must have resulted from the storm of projectiles that fell upon them before they were fairly out of the harbor. The injury received by the Americans is not deserving of mention in comparison with the damage they inflicted. The Texas, the Brooklyn, and the Iowa were the only vessels hit at all, and their injuries were so slight as to affect in no way their fighting or steaming qualities. One man killed and two wounded, all on the Brooklyn, were the only casualties in the fleet.

This great sea fight decided the issues of the war, since Spain with her best and only important fleet gone was at the mercy of her enemy. In no other modern war has the control of the sea been of greater importance. The military commander at Santiago, confronted by a superior hostile army, threatened by famine, and with the support of the ships lost, was in a fatal position, but Spanish ideas of honor sustained him, and he sturdily declined the first demands for surrender. The hopelessness of his position was fully proved to him

July 10 and 11, when the New York, the Brooklyn, and the Indiana from a position off Aguadores bombarded the city, firing over the high hills a distance of about five miles and dropping their shells with remarkable accuracy in the central part of the town. This resulted the next day in an armistice which came to an end on the 17th by the formal surrender of the city and the greater part of the province of Santiago de Cuba. The work of the big ships was now nearly over. The most of them went to Guantanamo Bay, where for the first time in months fires were allowed to go out in the main boilers and the ships allowed to cool by the permanent removal of the battle-hatches. Scrubbing and painting took away much of the evidence of hard service and changed the sullen gray war color back to the shining white of peace. A month later the New York led her band of battleships into New York harbor, where amid booming of cannon, waving of flags, and the cheers of a vast multitude, they received a triumphal welcome greater than any that Rome ever saw, and by the outburst of praise and gratitude from their countrymen the crews of the ships felt well repaid for all the toil, danger, and hardship of the months gone by. It was the first time in American history that a victorious fleet had come home from a foreign war.

INDEX

INDEX

Abyssinia, the British turret ship, 242.
Admiral class of battleships, 246.
Agamemnon, the British turret ship, 245, 246.
Agamemnon, the British war-ship, assists in the laying of the first Atlantic cable, 50, 51.
Agamenticus, the monitor. *See* Terror.
Ajax, the British turret ship, 245, 246.
Alabama, the battleship, 266.
Alabama, the Confederate cruiser, building of, 185, 186; goes to the Azores, 186, 187; preparations for commerce destroying, 187; many prizes captured, 187–193; engagement with the Hatteras, 189–191; goes to the Indian Ocean, to Brazil, and thence to Cherbourg, France, 192, 193; fight with the Kearsarge, 126, 193–199, picture of, 196; letter from the Secretary of the Navy regarding it, 200–202.
Albatross, the, 167.
Albemarle, the war-ship, 98.
Alicante, the Spanish hospital-ship, 312.
Alleghany, the steamer, 24, 43, 95.
Allen, Col. James, 315.
Allen, Dr. John, 4.
Almirante Cochrane, the Chilean ironclad, 231.
Almirante Oquendo, the Spanish armored cruiser, 298, 304, 344, 345.
Alvarado, Mexico, capture of, 39.
Amanda, the armed bark, 125.
Amethyst, the British corvette, 229, 230.
Amphitrite, the monitor, 217, 218, 256, 293, 300, 306.
Angamos, battle of, 231.
Anson, the British battleship, 246.
Ariel, the mail steamer, 189.
Arkansas, the Confederate armored ram, 164, 165.
Arkansas, the monitor, 266, 267.
Arminius, the Prussian war-ship, 227.
Armor for war-ships, 57–67, 214, 215.
Atlanta, the Confederate armored ram, 180–182.
Atlantic cable, 50–52.

"Baby Battleship," the Petrel so called, 287.
Bagley, Ensign Worth, 310.
Bailey, Capt. Theodorus, 155.
Baltimore, the protected cruiser, 279–281, 284, 286–288.
Bankhead, Capt. J. P., 142–145.

Barbette, the, 245.
Barfleur, the British battleship, 261, 262.
Battleship, evolution of the modern: the direct influence of Ericsson's designs, 212–224; rams, 220, 221; Capt. Coles's turret ships, 224–239; greater attention to stability in ships, 239; improvements in armor, 243, 244; gradual union of the best features of the various types of war-ships, 245; the distinctively American battleship, 258–262; the Monitor the prototype of the modern battleship, 267, 268.
Beaufort, the gunboat, 102, 105, 112.
Bell, Capt. Henry H., 156.
Benton, the gunboat, 99.
Bernouilli, Daniel, 8.
Black Prince, the British frigate, arrangement of armor on, illustration of, 64.
Blake, Commander Homer Crane, 190, 191.
Blanco, Captain-General at Havana, 315, 316.
Blanco Encalada, Chilean ironclad, 231.
"Blood is thicker than water," 56.
Boston, the protected cruiser, 279, 280, 281, 283, 284, 288.
Bouledogue class of French rams, 248; illustrations of, 252.
Boulton & Watt build steam engine for Fulton, 9.
Bramah, Joseph, 8.
Brandywine, the ship, 107.
Brooke, John M., 93–96.
Brooklyn, the armored cruiser, 299, 314, 317, 320, 321, 338, 340, 341, 345, 346, 349, 350.
Brooklyn, the steam sloop-of-war, 156, 159, 160, 203, 205, 207, 210, 341.
Brown, Rear Admiral George, 170.
Brunel, Sir Marc Isambard, 7, 17.
Buchanan, Franklin, appointed to command the Merrimac, 102; instructions, 102–104; the fight at Hampton Roads, 111, 113, 126, 136; sketch of his career, 114, 115; portrait, 170; in the battle of Mobile Bay, 210.
Buffalo, the ship. *See* Nictheroy.
Burgoyne, Capt., 237.
Bushnell & Co., builders of the gunboat Galena, 74–76.
Bushnell, C. S., his association with Ericsson, 78, 79.
Bushnell, David, 8.
Butler, Gen. B. F., assumes military control of New Orleans, 158.

Caldwell, Lieut., 155.
Caledonia, the steamer, 23.
California, the seizure of, 31–33; effect of its acquisition upon the destiny of Japan, 41.
Camanche, the monitor, 216.
Cambridge, the gunboat, 116.
Campbell, A. B., 120.
Canandaigua, the sloop-of-war, 149.
Canonicus class of war-vessels, 219, 220.
Capehart, Lieut., 331.
Captain, the British war-ship, 80; designed by Capt. Coles and built by the Lairds, 234–236; sunk while cruising with the Channel squadron, 236–239; illustrations of, 240.
Cardenas, battle of, 309, 310.
Carlos V., the Spanish ship, 304.

Catawba, the monitor, 247.
Catskill, the monitor, 173, 179, 180, 216.
Cayuga, the gunboat, 155, 157.
Centurion, the British battleship, 261; illustrations of, 262.
Cerberus, the British turret ship, 242.
Cervera, Admiral, 298, 314, 318, 328, 348.
Chalmette batteries silenced, 158.
Champion, the steamer, 36.
Charleston, S. C., invested by ironclads, 77, 141, 171; importance of the city to the Confederacy, 170, 171; desire of the Federal forces to capture it, 171; attack upon the fortifications, 173–176.
Charlotte Dundas, the tow-boat, 6, 7, 9.
Cherub, the British war-ship, 166.
Chesapeake pilots refuse to take the Monitor to Newport News, 125.
Chickasaw, the monitor, 202.
China, expedition of British, French, and American ministers to, in 1859, to exchange treaties, 54; battle near mouth of Pei-ho River, 55–57.
Cincinnati, the cruiser, 297.
Civil War, important naval events of: attack on Drewry's Bluff, 75; victory of the Merrimac, 109–117; fight of the Merrimac and the Monitor, 126–134; capture of Forts Henry and Donelson, 150; the opening of the Mississippi River, 151–170; operations on the Atlantic coast at Charleston, 170–180; surrender of the Atlanta, 180–182; Confederate privateering, 183–202; the Alabama, 185; her fight with the Kearsarge, 193–202; the battle of Mobile Bay, 202–211.
Clark, Capt. Charles E., of the Oregon, 263, 264.
Clermont, the steamboat, 10, 11; picture of, 10.
Clifton, the steamer, 160.
Coles, Capt. Cowper, his "cupola" ship, 224; his development of the turret idea, 224–226; Denmark builds the Rolf Krake from his plans, 226–228; the Huascar built for Peru, 228, 229; her career, 229–231; Coles's rebuilding of the Royal Sovereign, 232, 233; the Prince Albert, 233; the Monarch, 233, 234; the Captain, Coles's ideal ship, built under his personal supervision, 234; her loss, 236–240.
Colossus, the British battleship, 246.
Columbia, the cruiser, 299.
Columbus, the ship-of-the-line, 44.
Comet, the British steam vessel, 17, 18.
Commerce, mostly carried in sailing-vessels as late as 1861, 68.
Commerce of the United States during the Civil War, 183–185.
Commissioners for the Navy, 20, 21.
Commodore, the title and rank of, 35.
Concord, the gunboat, 279–281, 283, 284, 288.
Congress, the frigate, 108–114, 147.
Connecticut, the monitor, 266, 267.
Conner, Commodore David, 34, 36.

Conrad, the, one of the Alabama's prizes, 192.
Constitution, the frigate, measurements of, 13; comparison of its work to that of the Monitor, 119.
Continental Iron Works builds monitors, 215.
Cormorant, the steamer, 56, 57.
Cotton, Capt., of the Harvard, 312, 313.
Cramp Company, shipbuilders, 77, 259.
Craven, Commander Tunis A., 206.
Crimean War, use of shell-guns in, 58; gives first instance of use of rifled guns on shipboard, 64; floating batteries, 98; treaty at close of, 184; Capt. Coles's turret ship used in, 224.
Cristóbal Colón, the Spanish armored cruiser, 298, 304, 320, 321, 342, 344–348.
Cuba, condition of, in 1898, 272, 273; northern coast blockaded, 278, 292, 294.
Cumberland, the sloop-of-war, 88, 91, 108 111, 147.
Cupola vessel. *See* Ironclad.
Currituck, the gunboat, 119.
Cyane, the war-ship, 32.
Cyclops, the British turret ship, 242.

Dacotah, the steam sloop, 138.
Dahlgren, Rear Admiral John A., takes command of the squadron before Charleston, S. C., 179; continues the struggle for possession of Charleston Harbor, 179.
"Damn the torpedoes! Go ahead!" Farragut's order at Mobile Bay, 207.
Dandolo, the Italian war-ship, 249.
Darte, Mr., American consul in Martinique, 312, 313.
Davis, Jefferson, 94.
Davis, John Lee, 161.
Deerhound, the British yacht, 198–201.
De Horsey, Rear Admiral, with his ship the Shah and the corvette Amethyst, fights the Huascar, 229, 230.
Demologos, the war-ship. *See* Fulton the First.
Detroit, the cruiser, 300, 306.
Dévastation, the French floating battery, 61, 62.
Devastation, the British war-ship, 240, 241, 251; illustrations of, 240.
Dewey, Admiral George, in Manila Bay, 126; at Battle of Port Hudson, 169; his dispatch announcing arrival of the Oregon at Manila, 264; his squadron in the Pacific, 279–281; his orders in event of war with Spain, 279, 280, 281; battle of Manila Bay, 281–291; portrait, 292.
Dictator, the monitor, 217, 240.
Disappearing squadron, the Spanish fleet so called, 298, 311.
Double-enders, 148.
Downes, Commander, of the Nahant, 174.
Dragon, the tug-boat, 116, 129.
Drayton, Capt. Percival, 204.
Dreadnought, the British turret ship, 241.
Drewry's Bluff, attack on, by the Galena, the Monitor, and other vessels, 75, 140.
Duilio, the Italian war-ship, 249.
Dunderberg, the armored war-

ship, 220–222; illustrations of, 220.
Dundas, Lord, 6.
Du Pont, Rear Admiral S. F., commands the fleet off Charleston, S. C., 173, 178.

Eads, James B., 98, 219.
Eagle, the yacht, 297.
Edinburgh, the British battleship, 246.
El Caney, battle of, 294.
Engines, marine, growth of within fifty years, illustration of, 20.
England, her proposed occupation of California, 31–33.
English navy, the, first steam vessels of, 17–19.
Ericsson, John, portrait, frontispiece; monitor, 3; developing the system of screw propulsion, 8, 25, 26; the first to put the screw propeller to practical use, 25, 26; removes from England to the United States, 26; builds the Princeton with his patented screw, 26; designs a formidable gun, 27, 28, 60; his plan for an ironclad battery, 64–67; building of the Monitor, 74, 77–86, 121; overwhelmed with honors, 134; on the principles of the Monitor, 213; builds more monitors, 215–217; opposes double-turreted type, 218; comparison of his work with that of Capt. Coles, 225, 226; presents two guns to Sweden for ship bearing his name, 249.
Ericsson, the torpedo-boat, 275, 339, 343.
Ericsson's Folly, 10.
Esmeralda, the Chilean corvette, 230.
Essex, the frigate, 15; capture of, 166.
Essex, the iron-clad, 99; destroys the Arkansas, 165; assists in battle of Port Hudson, 167.
Evans, Capt. Robley D., 320, 339.

Fairbairn, William, 23.
Farragut, Admiral David G., 76, 115; commands the Mississippi River fleet, 151, 153, 156–169; portrait, 170; battle of Mobile Bay, 202–211.
Ferdinand Maximilian, the Austrian war-ship, 214.
Field, Cyrus W., 51.
Fifth Army Corps, in the Spanish-American war, 334, 335.
Filibusters, 273.
Fingal, the vessel. *See* Atlanta, armored ram.
Fitch, John, 5.
Florida, the monitor, 266, 267.
Flying squadron, the, in Spanish-American war, 299, 314, 315, 317, 319–321.
Foote, Commodore Andrew H., takes Fort Henry, 150, 170; portrait, 170.
Fort Donelson, capture of, in 1862, 150.
Fort Henry, capture of, in 1862, 150.
Fort McAllister, attacked by the Montauk, 172.
Fort Morgan, 205, 211.
Fort Moultrie, 174.
Fort Sumter, 174, 179.
Fort Wagner, 179.
Forrest, F., Mallory's letter to, concerning the Merrimac, 94, 95.
Fox, Gustavus Vasa, 80.
France, takes the lead in shell-guns, armored ships, and rifled

cannon, 61-64; general development of her navy, 246-248.
Fry, Capt. Joseph, Confederate commander at St. Charles, Ark., 163; charged with aiding a Cuban insurrection and executed, 164.
Fulton, Robert, his early life, 8, 9; becomes interested in steam navigation, 9; builds the Clermont, 9, 10; his success with the Clermont, 10, 11; importance of his work, 11, 12; designs and builds a steam war-vessel, 12, 13; his death, 14, 15.
Fulton the First, the war-ship (Demologos), construction of, 12; description of, 13; successful trial of, 13, 14; her fitness for use, 14; her armaments, 15; rigged by Capt. Porter, 15, 16; her destruction, 17, 20; illustrations of, 12.
Fulton (the second), construction of, 21, 22, 53.
Fulton's Folly, 10.
Furor, the Spanish torpedo-boat, 298, 312, 345.
Fury, the British turret ship. *See* Dreadnought.

Gaines, the gunboat, 209.
Galena, the gunboat, 74-76, 140, 208, 210; picture of, 76.
Garcia, Gen. Calixto, 337.
Gardiner, Col. David, 27.
Genesee, the gunboat, 167, 168.
Geneva Tribunal, 186.
Georgia, the battleship, 266.
Germantown, the sailing war-ship, 91.
Germany, armored ships of, 248.
Gilmer, Thomas W., 27.
Glatton, the British turret ship, 242, 243.
Gloire, La, ironclad ship, 63, 212, 247; illustration of, 64.
Gloucester, the armed yacht, 337, 338, 343.
Glynn, Commander James, 42.
Goldsborough, Capt. L. M., 138.
Gorgon, the British turret ship, 242.
Grant, Gen. Ulysses S., at Forts Henry and Donelson, 150, 151.
Grau, Admiral, 231.
Great Eastern, the steamship, 51, 52.
Greene, Lieut. S. Dana, officer of the Monitor, 120; his letter describing her voyage to Hampton Roads, 123, 124; takes command during the battle, 130, 134.
Gridley, Capt., 285.
Griswold, John A., 79.
Guantanamo Bay, seizure of, 334.
Guns, improvement in, 57-59.

Hampton Roads, naval engagement in, 68, 79, 90, 106-118.
Hands, R. W., 120.
Harriet Lane, the revenue cutter, 53, 151.
Hartford, the sloop-of-war, building of, 29, 149; in the Mississippi River during the Civil War, 151, 155, 156, 159, 160, 166, 167, 202-205, 207-211; picture of, 152.
Hartford class of steam vessels, the, 41.
Harvard, auxiliary cruiser, 312.
Haswell, Charles H., 21.
Hatteras, the armed steamer, fight with the Alabama, 189-191.
Hecate, the British turret ship, 242.
Helena, the gunboat, 279.

"Her Britannic Majesty's ship Vixen," 190.
Hist, the yacht, 339, 343.
Hobson, Richmond Pearson, naval constructor, 324–330.
Hope, Rear Admiral, British commander of expedition to China, 1859, 55–57.
Hotspur, the British turret ship, 242, 243.
Howard, Samuel, 125.
Huascar, Peruvian war-ship, built by the Lairds under direction of Capt. Coles, 228, 229; has an eventful career, 229–231; illustration of, 232.
Hudson, the revenue cutter, 310.
Hulls, Jonathan, 5.
Hunter, Lieut. Charles G., "Alvarado Hunter," 38, 39.
Hunter, Lieut. W. W., 24, 95.
Hydra, the British turret ship, 242.
Hydrostatic javelin, 67.

Illinois, the battleship, 266.
Inconstant, the British war-ship, 237.
Indiana, the battleship, 259–262, 274, 300, 306, 337, 338, 343, 344, 346, 350.
Infanta Maria Teresa, Admiral Cervera's flagship, 298, 304, 311, 314, 344, 345.
Inflexible, the British turret ship, 241, 242, 245, 248, 249; illustrations of, 242.
Iowa, the battleship, 264, 265, 274, 300, 301, 303, 306, 309, 314, 320, 321, 326, 337–339, 342, 343, 345, 346, 349.
Iron vessels, the first, 22, 23.
Ironclad cupola vessel by Ericsson, illustrations of, 82.
Ironclad vessels, early experiments with, 59–61; gradual adoption of, 61–67. *See* also Monitor and Merrimac.
Iroquois, the sloop-of-war, 151, 156, 159.
Isabel II., the Spanish cruiser, 296.
Isherwood, Benjamin F., naval engineer, 88, 89.
Italy, war-ships of, 248, 249.
Itasca, the gunboat, 155, 156, 203.

Jackson, the earth-work battery near New Orleans, 152, 153, 158.
Jamestown, the gunboat, 102, 105, 106, 112, 136, 137.
Japan, the opening of, 41–50.
Jenkins, Friend W., 276.
Jet propulsion, 4, 5, 7.
John Ericsson, the Swedish monitor, 249.
Jones, Lieut. Catesby ap R., in the naval battle in Hampton Roads, 126, 127, 131.
Juniata, the sloop-of-war, 149.

Kalamazoo, uncompleted monitor, 222.
Kane, Lieut., of the Harvard, 312, 313.
Katahdin, the gunboat, 159.
Kearsarge, the sloop-of-war, 126; fight with the Alabama, 193–202, picture of, 196.
Kearsarge, the battleship, 265, 266.
Keeler, W. F., 120.
Kennebec, the gunboat, 156, 159, 203, 210.
Kennon, Capt. Beverly, 27.
Kentucky, the battleship, 265, 266.
Keokuk, the ironclad, 173, 174.
Kilty, Commander, of the Mound City, 163.

Kinburn, battle of, 62.
Kineo, the gunboat, 167.
Knowles, quartermaster of the Hartford, 204.

Lackawanna, the sloop-of-war, 149, 203, 210.
Lady Nancy, Capt. Coles's "cupola ship," 224, 247.
Laird, Messrs., builders of the Alabama, 185; of the Prince Henry and the Huascar, 228; the Captain, 234–236.
Lave, the French floating battery, 61.
Lawton, Gen. Henry W., 335, 336.
Lee, Robert E., 37.
Lehigh, the monitor, 216.
Levant, the war-ship, 32.
Lightning, the steamer, 18.
Lissa, battle of, 213, 214, 228.
Livingston, Robert, 9, 10.
Logue, D. C., 120.
Lôme, Dupuy de, naval architect, 63.
London Times on the Monitor, 135.
Long, John D., letter from, to Rear Admiral Sampson, 304, 305; dispatch from, 311.
Lopez, Carlos Antonio, 52.
Lord Warden, the British war-ship, 236.
Lyttleton, William, 8.

McClellan, Gen. George B., quoted on the fight of the Merrimac, 118.
MacCord, Prof. C. W., 83.
McCulloch, the revenue cutter, 279, 280, 283, 284.
Macedonian, the British frigate, 126.
Magdala, the British turret ship, 242.
Mahan, Capt. A. T., quoted concerning the voyage of the Oregon, 263.
Maine, the battleship, description of, 257, 258; illustrations of, 258; sent to Havana, 274; her destruction in Havana harbor, 275, 276; reports of the courts of inquiry, 276, 277.
Maine (2d), the battleship, 266.
Mallory, Stephen Russell, urges Confederate naval committee to construct an ironclad, 92, 93, 100; his letter to F. Forrest concerning the Merrimac, 94, 95; letter to Franklin Buchanan, appointing him commander of the Merrimac, with suggestions as to her work, 102–104.
Manassas, the iron-plated ram, 98, 157.
Manhattan, the monitor, 202.
Manila Bay, battle of, 126, 271; chart of, 286.
Marblehead, the cruiser, 310, 314, 320, 321.
Marietta, the gunboat, 262, 263.
Marine engines. *See* Engines.
Marsden, Capt. John, 119, 124.
Maryland Agricultural College, 115.
Massachusetts, the battleship, 259–262, 274, 299, 321, 323, 338.
Maxey, Virgil, 27.
Mayflower, the converted yacht, 319.
Mazatlan, Mexico, 32.
Meade, R. W., 170.
Merrick & Sons, builders of the New Ironsides, 74, 76, 77.
Merrimac class of steam vessels, the, 41.
Merrimac, the frigate, building of, 29; efforts to save her from

the Confederates, 88, 90; scuttled and upper works burned, 91; raised by the Confederates, 91; converted into an ironclad battery, 92–98; pictures of, 96; name changed to Virginia, 101; plans for her action, 102–104; she attacks the Union squadron in Hampton Roads, and destroys the Congress and Cumberland, 105–117; battle with the Monitor next day, 126–134, picture of, 130; size and armor of, compared with Monitor, illustrations of, 120; far-reaching results of the conflict, 134, 135; her subsequent history and destruction, 135–140.
Merrimac, the collier, 320; sinking of, in the Spanish-American war of 1898, 95, 324–330.
Merritt, Darwin R., 276.
Metacomet, the gunboat, 203, 205, 209, 210.
Meteor, the steamer, 18.
Mexican War, the, naval operations in, 31–40.
Miantonomoh, the monitor, 217, 218, 240, 256.
Miantonomoh class of war-ships, 253, 258.
Michigan, the war-steamer, 22.
Miller, Patrick, 5, 6.
Millwall Shipbuilding Company, 228.
Mines, submarine, in naval warfare, 173, 174, 284, 331.
Minneapolis, the cruiser, 299.
Minnesota, the frigate, 107; at Hampton Roads, 115–117, 125–133.
Mississippi, the war-steamer, construction of, 22; on blockade duty in the Mexican War, 33, 34; at the taking of Tabasco, 36; taken home for repairs, 36; returns to Mexico, 36; her cruise in the Mediterranean, 43; Perry's first flagship on the expedition to Japan, 43; in the Mississippi River fleet, 151, 155, 157, 166; destruction of, 168, 169.
Mississippi Bay, Japan, 47.
Mississippi River, naval actions in, during the Civil War, importance of, 150; preparations for, 151; capture of New Orleans, 152–158; batteries at Vicksburg passed, 158–164; engagements with the Arkansas, 164, 166; battle of Port Hudson, 166–169.
Missouri, the battleship, 266.
Missouri, the war-steamer, 22.
Mobile Bay, battle of, 115, 202–211.
Mohican, the sloop-of-war, 29.
Monadnock, the monitor, 217, 218, 256.
Monarch, the British war-ship, 233, 234; illustrations of, 240.
Monitor, the ship, an epoch-maker, 3; foreshadowings of, 59, 60, 64–67; building of, 70, 74, 77–86, 101; illustrations of, 82; lack of faith in, 101; final trial trip, 119; officers, 119–121; crew, 121; perilous voyage to Hampton Roads, 119–124; size and armor of, compared with Merrimac, illustrations of, 120; timely arrival and preparations for battle, 125; fight with the Merrimac, 126–134, picture of, 130; far-reaching influence upon naval warfare, 134, 135; subsequent history and loss of the Monitor, 138, 140–145; popularity of the type, 212–219.

Monitors, fleet of, urged by the people, 170; several such vessels built and sent to Charleston, S. C., 170–172; their work in the vicinity, 172–174; Du Pont's report, 175; Stimers's report, 176–178; continued building upon the Monitor type, 215–224, 246; use of the old monitors in the Spanish-American war, 266; four new monitors ordered to be built, 266.
Monocacy, the gunboat, 148, 279.
Monongahela, the sloop-of-war, 149, 166, 167, 203, 210.
Montauk, the monitor, 172, 173, 216.
Monterey, Cal., 32.
Monterey, the monitor, 258.
Montgomery, the cruiser, 300.
Montojo, Admiral, 281, 282.
Moore, John W., 154.
Morgan, the gunboat, 209.
Morris, Lieut. George U., executive officer of the Cumberland, 109, 110.
Morris Island, 174.
Mound City, the gunboat, terrible disaster to, 162, 163.
Mullany, Commander, of the Oneida, 209.

Nagasaki, 42.
Nahant, the monitor, 172–174, 180–182, 216.
Nanshan, the steamer, 281, 284.
Nantucket, the monitor, 173, 176, 216.
Napier, Scotch shipbuilder, 226.
Napoléon, the French ship, 63.
Narragansett, the sloop-of-war, 29.
Nashville, the gunboat, 310.
Nashville, the Confederate privateer, 172.
Naugatuck, the ironclad steamer, 137, 138.
Naval brigade, the first, 40.
Navy Department of the United States, does little during the period following the Civil War, 223, 224, 252–255; revival of interest, 256.
New Ironsides, the ironclad steam frigate, 76, 77, 173; picture of, 76.
New Jersey, the battleship, 266.
New Orleans, capture of, by Federal fleet, 158.
New Orleans, the cruiser, 321.
New York, attack on, planned by Confederate officers, 103.
New York, the armored cruiser, 297, 300, 301, 303, 306, 309, 314, 318, 319, 321, 326, 337–339, 342–344, 346, 348, 350; picture of, 298.
Newport News, Union batteries at, 108, 109, 115.
Newton, Isaac, 120.
Niagara, the collier, 300.
Niagara, the frigate, 50, 51.
Nictheroy, the war-ship, 263.
Nile, the British battleship, 246.
Ninety-Ninth New York Volunteer Infantry in the fight at Hampton Roads, 113, 114.
Norfolk, city of, abandoned to the Union forces, 139.
North Atlantic Blockading Station, report of, concerning the loss of the Monitor, 142–145.
North Atlantic squadron, movements in 1898. *See* Spanish-American war.
Norway, war-ships of, 249.
Novgorod, the Russian steam battery, 251; illustrations of, 252.

Octorara, the gunboat, 137, 203, 210,

Ohio, the battleship, 266.
Old Dominion Company, steamers of, used in Civil War, 105, 106.
Olympia, Dewey's flagship, 279–281, 284–286, 288, 289; picture of, 280.
Oneida, the sloop-of-war, 76, 149, 151, 153, 155, 159, 160, 208, 209, 210.
Oneota, the monitor, 247.
Onondaga, the monitor, 219, 247.
Ordinance of Secession of Virginia, 90.
Ordnance, growth of, within fifty years, illustration of, 20.
Oregon, the battleship, 259–262; voyage from the Pacific to the Atlantic coast, 262–264, 319; her part in the battle of Santiago de Cuba, 264, 319, 322, 337, 338, 345, 346; her return to the Pacific, 264; picture of, 264; represents the highest development of the Monitor, 268.
Oregon class of battleships, 260–262, 265; illustrations of, 262.
Ossipee, the war-ship, 203, 210.

Paddle-wheels, disadvantage of, in war-vessels, 23, 24; Hunter's horizontal, 24, 25.
Paixhans, Col., inventor of shell-guns, 58; his plans for armoring war-ships, 60.
Papin, Denis, 4, 11.
Paraguay expedition of 1858, 52–54.
Paris, Treaty of (1856), 184, 185.
Passaconaway, the uncompleted monitor, 222.
Passaic, the monitor, 141, 171, 172, 173, 176, 216; illustration of, 256.
Passaic class of war-vessels, 219, 249, 250.
Patapsco, the monitor, 172, 173, 176, 216.
Patrick Henry, the gunboat, 102, 105, 106, 111, 112, 117.
Pawnee, the sloop-of-war, 30, 90, 91.
Peacemaker, the gun, 26.
Pei-ho River, battle near mouth of, 55–57.
Pelayo, the Spanish war-ship, 304.
Pendergrast, Lieut., 109.
Penelope, the British frigate, 18.
Pennsylvania, the battleship, 266.
Pensacola, the sloop-of-war, 155.
Perry, Matthew Calbraith, on the Fulton, 22; commands steam vessels in the naval operation of the Mexican War, 34; takes Tabasco, 36; takes the Mississippi home for repairs, 36; put in charge of fitting out small steam vessels for service in Mexico, 36; relieves Conner as commander of the American squadron, 36; assists in the capture of Vera Cruz, 36–38; his orders to Tattnall and their execution, 38; public disapproval of his just course in the Alvarado incident, 39; recaptures Tabasco, 40; organizes the first naval brigade, 40; commands an expedition to Japan, 43; his diplomatic negotiations with the Japanese, 45–49; his treaty with Japan, 49.
Perry, the brig, 147.
Peter the Great, the Russian war-ship, 251.
Petrel, the gunboat, 279–281, 284, 287, 288.
Petrel, the Confederate privateer, 147.

Petrita, the steamer, 36.
Phœbe, the British frigate, 166.
Pilot Town, 153.
Pluton, the Spanish torpedo-boat destroyer, 298, 314, 327, 345.
Plymouth, the sailing war-ship, 43, 91.
Polk, the revenue cutter, 36.
Popoff, the Russian admiral, 251.
"Popoffkas," the Russian steam batteries, 251.
Port Royal, the gunboat, 203.
Porter, Capt. David, commands the frigate Essex, 15, 166.
Porter, Admiral David D., commands flotilla of mortar-schooners on the Mississippi, 151–153, 158–161, 165, 170; portrait, 170.
Porter, John L., 94–96.
Porter, William D., commands the ironclad Essex, 165, 166.
Porter, the torpedo-boat, 300, 311, 319, 325.
Powell, Cadet, 326, 327.
Powhatan, the steamer, 28; becomes Perry's flagship in the East, 46; flagship of Capt. Tattnall on expedition to China, 54.
Prat, Arturo, captain of the Esmeralda, 230.
Preble, Commodore George Henry, 44.
Preble, the brig, 42.
Prince Albert, the British turret ship, 233.
Prince Henry, the Dutch war-ship, 228.
Princeton, the sloop-of-war, construction of, 26; the tragedy of, 26, 27; her importance as the first screw war-ship, 27; her powerful gun, 27, 28; on blockade duty in the Mexican War, 33, 43; her engine, 83.
Privateering, 183–185.
Puritan, the monitor, 217, 240, 253, 255, 256, 293, 297; illustration of, 256.

Quinsigamond, the uncompleted monitor, 222.
Quitman, Gen. John Anthony, 39.

Radford, William, commander of the Cumberland, 109.
Raleigh, the protected cruiser, 279–281, 284, 287, 288.
Raleigh, the gunboat, 102, 112, 113, 117, 137.
Ram, the, as a naval weapon, 213, 214.
Ramsay, F. Ashton, 97, 98.
Rank and titles, naval, 35.
Re d' Italia, the war-ship, 214.
Reed, Sir Edward J., British naval constructor, 240.
Reina Cristina, the Spanish cruiser, 281, 288, 289.
Reina Mercedes, the Spanish war-ship, 323, 327.
Resolute, the auxiliary cruiser, 338.
Ressel, Austrian engineer, 25.
Restormal, the English steamer, 317.
"Revolution in naval architecture," 212.
Rhode Island, the steamer, 141–145.
Richmond, the sloop-of-war, 154, 156, 157, 159, 160, 166–168, 203, 210.
Rifled guns, 64.
Rinaldo, the British war-ship, 138.
Rip-Raps, the fort, 138, 139.
"Rise and Fall of the Confeder-

DEC 08 1984

DATE DUE

42406
Call Number

LA
55
.B48

Author Bennett

Title The Monitor and
the Navy Under Steam

Volume

Copy

Please Check

☑ Undergrad.
☐ Grad.
☐ U.M. Staff
☐ Other

Form 7900

PLEASE PRINT

I.D. No. [illegible]

Name M. Bennett K. Greenlee

Street Address [illegible] S. Forest

City Ann Arbor Michigan 48104
Zip Code

U.M. Staff Department

Position

Phone

; his in-
ait, 292;
Havana,
uadron to
; ordered
14; hears
ish fleet,
uba, 318;
, 319; ar-
322; his
paign, 324,

ner, 28.
co, Spanish
lockade of,
expected to
American
re, 300–303;
ortifications,

the castle of,

itor, 216.
harbor of, en-
h fleet, 315;
126, 339–350;

ship, 43.
Commodore
32.
nfederate pri-

dore Winfield
318, 321.
at, 156.
aboat, 36.
ret ship, 231.
field, 36, 37.
iboat, 36; at the
arado, 39.
, the, origin of,
5, 7, 8; development of, 25,
26; its adoption in the United
States Navy, 28; first use of
twin screws in the U. S. Navy,
30.

296, 317, 320.
St. Philip, the earthwork bat-
tery near New Orleans, 152,
155, 158.
Sampson, Rear Admiral William
T., 126, 276; succeeds Rear

Secretary of the Navy, office of, 20.
Selma, the gunboat, 209, 210.
Seminole, the steam sloop, 138, 203.
Semmes, Raphael, captain of the Alabama, 187–194, 199, 200.
Seth Lowe, the steamer, 119.
Sewell's Point, Confederate batteries at, 109, 116.
Shackamaxon, the uncompleted monitor, 222.
Shafter, Maj.-Gen. William R., 334, 336, 337, 339.
Shah, the flagship of Rear Admiral De Horsey, 229, 230.
Shell-guns, introduction of, 58, 59.
Shenandoah, the sloop-of-war, 149.
"Short History of the Confederate States, A," by Jefferson Davis, 94.
Shorter, Edward, 8.
Shubrick, W. B., naval commander of the Paraguay expedition, 53.
Siboney, Gen. Lawton takes possession of, 336.
Sicard, Rear Admiral Montgomery, in command of North Atlantic squadron, 274, 275; succeeded by William T. Sampson, 291.
Simpson, Rear Admiral Edward, 29.
Sinope, battle of, a test of shell against shot, 58, 59, 61.
Sloat, Commodore John D., 32.
Smith, Joseph B., executive officer of the Congress, 109.
Smith, William, commander of the Congress, 109, 113.
Solace, the hospital-ship, 310, 311.
Soley, Prof. James Russell, quoted on naval conditions at the battle of Hampton Roads, 108.
Spanish-American war, general conditions preceding, 269–273; battleship Maine sent to Havana, 274; her destruction in Havana harbor, 275, 276; the courts of inquiry, 276, 277; preparations for war, 277, 278; orders to blockade northern coast of Cuba, 278; condition in the Pacific, 279; instructions to Commodore Dewey, 279, 280; his squadron proceeds to the Philippines, 280–284; battle of Manila Bay, 284–291; William T. Sampson appointed to command the North Atlantic squadron, succeeding Rear Admiral Sicard, 291, 292; his orders, 292, 293; Sampson's suggestion of attack on Havana not carried out, 293, 294; the blockade of Havana begun, 294, 295; character of the fleet, 295, 296; Spanish attacks, 296, 297; action at Matanzas, 297; the Spanish squadron starts across the Atlantic, 298; doubts as to its whereabouts, 299; belief that it will appear at San Juan, Puerto Rico, 300; small squadron of American ships proceeds thither to meet it, 300–303; attack on the fortifications, 304–310; letter of Sec. Long, 304, 305; engagement in the harbor of Cardenas, 309, 310; the Spanish squadron appears in the West Indies, 311–314; search for it, 314–320; found at Santiago de Cuba, 320; the harbor blockaded, 322–324; sinking

of the Merrimac, 324–330; a month of continued blockade duty, 332; arrival of Gen. Shafter's force, 334–337; bombardments, 337, 338; naval battle of July 3, 338–349; surrender of Santiago, 350; American fleet returns to New York, 350.
Spanish fleet lost at Manila, names of the vessels composing, 288.
Spitfire, the gunboat, 34; at the bombardment of Vera Cruz, 38.
State of Georgia, the steamer, 141.
Steam and sail power, conflict of: Captain Porter and the Fulton, 15, 16; a long standing rivalry, 17; in Great Britain, 18, 19; the attitude of the Commissioners for the Navy, 21; a valid objection to the use of steam, 23, 24; Congress appoints a committee to investigate the use of steam for naval purposes, 28; use of full sail power with steam as an auxiliary, 29; advantages of steam power, 30; naval prejudice against steam to a great extent overcome by the lesson of the Mexican War, 40, 41; but still persists, 67, 68; the matter finally settled by the work of the Merrimac and Monitor, 118, 119, 135; Civil War gives first instance of general use of steam vessels in naval operations, 146.
Steam navigation, early experiments in, 4–8; established on a commercial basis by the success of Fulton's Clermont, 9–12.
Sterling, the boat, 324.
Stevens, John, his experiments in steam navigation, 7, 9; his plan for an armored war-ship, 59.
Stevens battery, 60, 61, 70, 95, 137, 138, 212.
Stimers, Alban C., government superintendent of the construction of the Monitor, 79; goes to sea with her, 120, 121, 134; inspects the building of other monitors and goes to Charleston to care for them, 176, 177; his report of their working, 177, 178.
Stockton, Capt. R. F., 26.
Stodder, Louis N., 120.
Sullivan's Island, battle of, 77, 174.
Sunday, the day of many famous naval battles, 125, 126.
Sundstrum, M. F., 120.
Susquehanna, the steam frigate, 40; Perry's flagship in the East, 43, 50, 138.
Suwanee, the, 337.
Sweden, war-ships of, follow Ericsson's designs, 249.
Symington, William, 6, 9.
Symonds, Sir William, 18, 19.

Tabasco, Mexico, first capture of, 36; recapture of, 40.
Tattnall, Commander Josiah, his tilt with Perry at the bombardment of Vera Cruz, 37, 38; expedition to China, 54–57; commands the Merrimac, 136–140.
Taureau, the French monitor ram, 247, 248.
Taylor, Bayard, 46.
Teaser, the gunboat, 102, 105, 106, 113.
Tecumseh, the monitor, 202, 204, 205–207, 210, 220.

Tennessee, the ironclad, 202, 204, 205, 208–210.
Terror, the monitor, 217, 218, 256, 300, 306, 308.
Terror, the Spanish torpedo-boat destroyer, 296, 313.
Texas, the battleship, building of, 256, 257; record in the Spanish-American war, 257, 274, 299, 320, 321, 323, 326, 334, 335, 338, 339, 341, 345, 346, 349; illustrations of, 258.
Thomas Jefferson, the gunboat. *See* Jamestown, the gunboat.
Thunderer, the British war-ship, 240, 241.
Ticonderoga, the sloop-of-war, 149.
Timby, Theodore R., his plan for a revolving battery, 59, 60, 213.
Toey-wan, the steamer, 55, 56.
Toffey, Daniel, 120.
Tonawanda, the monitor. *See* Amphitrite.
Tonnante, the French floating battery, 61.
Torpedo, first used in warfare, 230.
Trafalgar, the British battle-ship, 246.
Treaty of Paris. *See* Paris, Treaty of.
Trenchard, Stephen Decatur, 56, 145.
Trinity Bay, Newfoundland, terminus of first Atlantic cable, 51.
Triple hull boat, illustrations of, 6.
Turtle-backs, 219.
Tuscaloosa, the Confederate cruiser, 192.
Tuscarora, the sloop-of-war, 149.
Tyler, John, President, 26, 27.
Union, the steamer, 24.
Union Iron Works build the Oregon, 259.
United States, the frigate, 126.
United States Congress considers providing armored vessels for use in Civil War, 70–74.
Upshur, Abel P., 27.

Valencia, Ire., terminus of first Atlantic cable, 50, 51.
Valorous, the steamer, 18.
Vandalia, the sloop-of-war, 147.
Varuna, the armed merchant-steamer, 151, 155, 157, 158.
Vengeur class of coast-defense vessels, 248.
Vera Cruz, 36–38.
Vice Admiral Popoff, the Russian steam battery, 252.
Vicksburg, Federal fleet under Farragut passes the batteries at, 158–161, 164.
Victory, Nelson's flagship, 13.
Virginia, her attitude in the Rebellion, 90.
Virginia, the war-ship. *See* Merrimac.
Virginius, the merchant-vessel, 164.
Vixen, the converted yacht, 321, 328, 338, 342.
Vixen, the gunboat, 34, 36; at bombardment of Vera Cruz, 38.
Vizcaya, the Spanish armored cruiser, 298, 304, 311, 314, 344, 345, 346.

Walker, Sir Baldwin, 19.
Walker, John G., 170.
Ward, Hon. John E., American minister sent to China in 1859, 54, 55.
Warrior, first British armored ship, 63, 135, 212, 243, 247, 248; illustration of, 64.

Water Battery, the earthwork near Mobile Bay, 205.
Water Witch, the steamer, 24, 52, 53.
Watson, Commodore, 319.
Webb, W. H., shipbuilder, 221.
Webber, John J. N., 120.
Weehawken, the monitor, 173, 181–183, 216, 217.
Welles, Gideon, reports on condition of the navy, and requests consideration of ironclads, 71; favors building the Monitor, 78; his letter to Capt. Winslow after the defeat of the Alabama, 200–202.
Whitehall, the gunboat, 117, 129.
Widemark, ——, killed at San Juan, Puerto Rico, 309.
Williamson, William P., 93–96.
Wilmington, the gunboat, 31.
Winnebago, the monitor, 202.
Winslow, John A., commander of the Kearsarge, 193, 194, 199.
Winslow, John F., 79.
Winslow, the torpedo-boat, 310.
Wisconsin, the battleship, 266.
Wompatuck, the armed tug, 300, 306, 316.
Woodbury, paymaster of the Catskill, 180.
Worden, John L., commander of the Monitor, 86, 120, 124, 130, 134; portrait, 170; of the Montauk, 172.
Wyoming, the sloop-of-war, 192.
Wyoming, the monitor, 266, 267.
Wyvern, the turret ship, 231.

Yale, the auxiliary cruiser, 320.
Yeddo, 47, 48.
Yeddo Bay, 43, 47.
Yokohama, 47, 48.
Yorktown, the steamer. *See* Patrick Henry, the gunboat.
Young, Lieut., 339.
Young America, the tug, 116.

Zafiro, the steamer, 281, 284.
Zouave, the gunboat, 112.

The Riverside Press
Electrotyped and printed by H. O. Houghton & Co.
Cambridge, Mass, U. S. A.